# THE IMPACT OF THE TRANSATLANTIC TRADE & INVESTMENT PARTNERSHIP (TTIP) ON LOW INCOME COUNTRIES:

## Agreement heterogeneity and supply chain linkages

**by**

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**ABSTRACT**

The Transatlantic Trade & Investment Partnership (TTIP) that is currently being negotiated between the EU and USA is aimed to stimulate international trade between the two partners. Most research indicates that the economic effects for the EU and USA are positive, but that with regard to third countries the economic effects seem less certain. Most existing studies point to the (negative) trade diversion effects for third countries. What is neglected in the literature is *agreement heterogeneity*; the ambition of TTIP is far reaching and the provisions discussed encompass much more than just the standard trade measures. A related topic is the influence of supply chains in determining the impact of TTIP on third countries. If strong supply chains exist between the TTIP partners and third (low income) countries, trade diversion need not occur. In general, we find that some provisions have a statistically significant impact on trade (positive as well as negative). Others have no effect at all, but can be important for other (policy) reasons than trade. The trade effects of TTIP for the EU and USA are positive. Third country effects are diverse, but for the poorest countries they tend to be positive, especially if provisions mutually reinforce each other. Stylized facts on supply chains show that we do not have to modify our results by including supply chains explicitly for the lowest income countries. Instead, supply chain effects are concentrated in middle income countries. This is largely in line with our results for the trade effects.

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## Executive Summary

*Introduction:*

Currently the EU and the USA are negotiating a new Regional Trade Agreement (RTA): The Transatlantic Trade and Investment Partnership (TTIP). After the official announcement in February 2013, the negotiations started in July 2013, and are still ongoing. If successful, TTIP will be the largest RTA to date. The TTIP countries represent 47.3 percent of the world's imports, 43.2 percent of the world's exports, 35.6 percent of the world's total income, and 12.1 percent of the world's total population. The non-participating 'Rest of World' (RoW) countries represent almost 90 percent of the world population and a little more than half of the world trade flows.

The European Commission expects positive trade and welfare effects for the members of TTIP and is also confident that most third country effects will be positive. TTIP envisages to:

- Eliminate or reduce tariffs and tariff-rate quotas
- Eliminate, reduce, or prevent barriers to trade in goods and services
- Eliminate, reduce, or prevent barriers to investment
- Enhance compatibility of regulations and standards
- Eliminate, reduce, or prevent unnecessary "behind the border" Non-Tariff Barriers"
- Apply to trade in all categories
- Enhance cooperation for the development of rules and principles on global issues
- Achieve shared global economic goals of common concern

*The literature:*

The literature on the effects of TTIP shows that trade between the EU and the USA will (most likely) be positively affected by TTIP, while third country effects are less certain; most studies however, find negative third country effects. Calculations with respect to third countries are met with many uncertainties: many countries have an RTA with the EU or the USA (see Map A-1) and will hardly be affected by adverse trade diversion effects. For some countries trade with the EU or USA is not very important, while other countries have a strong supply chain linkage with the EU or USA and an increase of trade between TTIP partners might be felt throughout the supply chain. Various elements of TTIP could have a different impact on trade flows, which is central in this study.

*Agreement heterogeneity (this study):*

For 296 trade agreements in our sample, we distinguish 26 different policy areas in trade agreements, organized in three groups. The first group involve the so-called $WTO^+$ provisions that are within the current mandate of the WTO: agriculture, anti-dumping & countervailing measures (AD&CVM), customs administration, export restrictions, import restrictions, intellectual property rights (IPR), investment, public procurement, sanitary & phytosanitary measures (SPS), services, state aid, state trading enterprises (STE), and technical barriers to trade (TBT).

The second group is not yet part of WTO negotiations and is labelled $WTO^X$ provisions: capital mobility, competition, environment, and labour. However, these are part of RTAs.

The third group relates to institutional quality (IQ). These describe how an agreement should be implemented and enforced and for example refer to information about consultations, definitions, dispute settlement, duration & termination, an evolutionary clause, an institutional framework, objectives, plan & schedule, and transparency (See Table 4-1 for a complete list).

*Agreement heterogeneity, the findings:*

We apply a state-of-the-art version of the gravity model that allows for third country effects, to determine the contribution of various elements in trade agreements. Our panel dataset consists of a maximum of 220 countries and covers the years 1948-2011, with 220 x 219 x 64 = 3,083,250 possible observations.

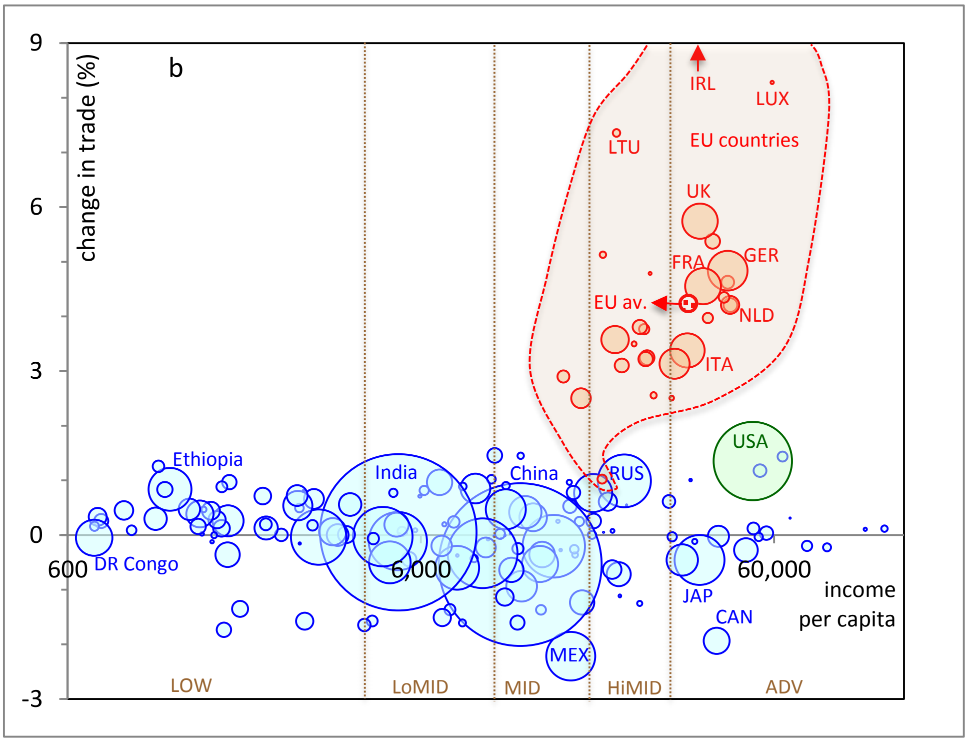
We conclude:

- Representing RTAs with a simple binary dummy is neglecting the heterogeneity of RTAs.
- Different provisions have different effects; some contribute positively to trade, some negatively, and some not at all. Provisions with a negative effect might *signal* the presence of a specific trade issue that affects a particular pair of countries and is the reason that it is part of an agreement, whereas for other countries this trade issue does not limit trade. Provisions that do not have a statistically (significant) effect might signal that a specific trade issue no longer is an issue for trade between countries (past agreements have solved that problem).

*Simulated TTIP effects:*

- The method of analysis is the gravity model. It states that bilateral trade is larger if the economic size of trading partners is large and barriers to trade small. Modern variant of the gravity model include price-substitution effects (related to trade diversion/creation) and income effects. Price effects of TTIP are, in general, negative for third countries because prices between EU-USA decline, which adversely affects competiveness of non-participating countries. Income effects are in general positive (because TTIP increases income in the USA-EU which stimulates world demand for exports). The net effect of price/income changes determines the TTIP consequences for non-participating countries in this study (as well as for the EU-USA TTIP partners). We assume that TTIP will become fully effective.
- We identify five income groups to classify our results for countries at different levels of economic development. From low to high income we label these groups: LOW, LoMID, MID, HiMID, and ADV.
- The variation for all income groups is substantial, (see Figure 5-7). Some big countries such as Canada and Japan are faced with negative trade effects. Others, such as Russia and Turkey are faced with positive trade effects.

*Figure 5-7 TTIP trade effects; RTA dummy approach, relative change in percent*




Source: see text. The bubbles are proportional to population size. The size of the bubbles visualizes the contribution of the most important countries by the size of the bubble. Representing each country as a one-dimensional 'dot' would make it impossible to distinguish the relative importance of say, Luxembourg versus China

- Countries in the middle income group, particularly the bigger countries such as China, Brazil, and Mexico, are confronted with negative trade effects. They experience trade diversion effects of TTIP (that benefits EU-USA trade), as they are more likely to supply goods for which a TTIP alternative is available. These negative effects cannot be compensated by positive income effects.
- The LOW income group is generally confronted with positive trade effects, particularly for most African countries, such as Togo and Ethiopia (with Chad as an exception). For some low income Asian (Cambodia) and American (Haiti) countries the effects are negative. These results are the net effect of trade diversion and income effects. Trade diversion effects are small for African countries as they supply resource related commodities for which no TTIP alternative is readily available, but relatively large for low-income American countries as they supply commodities for which a TTIP alternative is available. Positive income effects from income growth in TTIP countries (income effects increase demand for goods from low income countries) further compensate trade diversion effects.
- In general; countries that compete with TTIP partners are feeling strong trade diversion effects if they supply commodities for which TTIP alternatives are readily available (more likely for countries close to USA, less likely for African countries ).
- RTA provisions come in clusters, so a proper analysis of the impact of RTA heterogeneity on the TTIP outcomes takes this clustering into consideration. We do so by using a provision-based factor analysis focusing on three main factors: broad competition, broad government, and broad institutions.
- The deviations between the TTIP trade effects for RoW countries using either the standard dummy approach or the provision-based factor analysis are modest. The factor analysis nonetheless on average leads to more positive trade effects, particularly by moderating the impact for the countries with the most adverse trade effects, (see Figure 5-9)

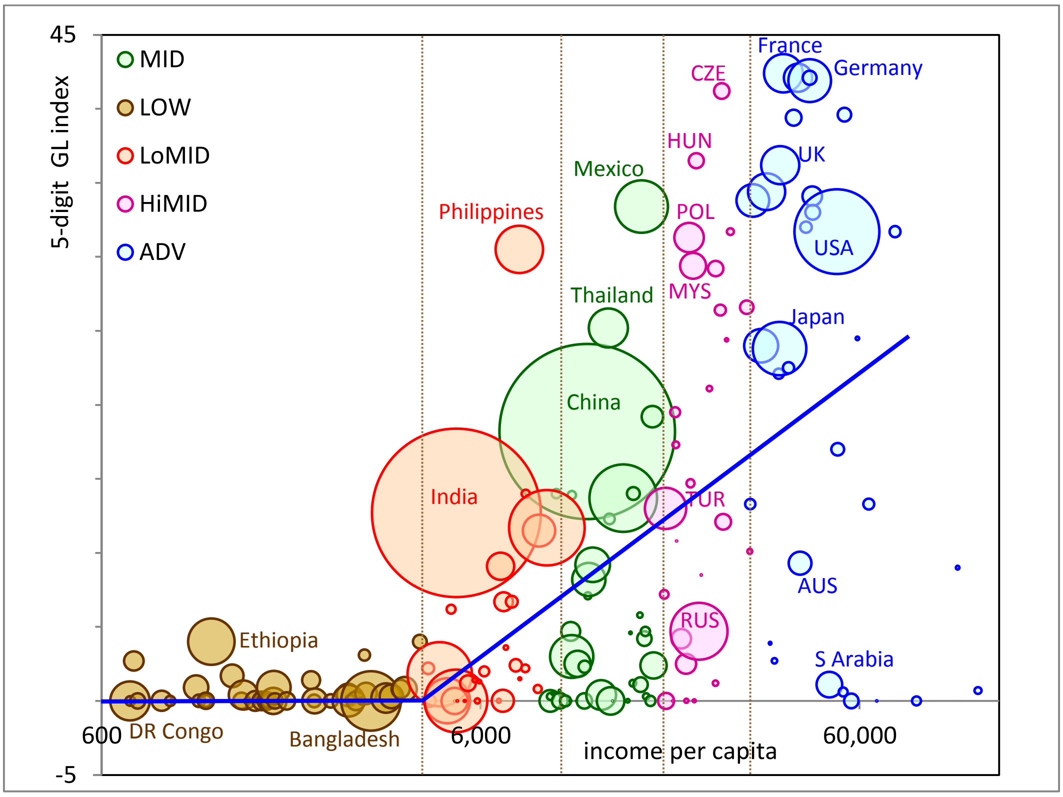
*Supply chain effects:*

- Detailed information on global supply chains at a disaggregate level is not readily available, despite the valuable recent attempts to construct estimates of value-added trade flows rather than gross export flows.
- The building of supply chains is an ever ongoing and ever more-involved and complicated dynamic process that is notoriously difficult to predict. From that perspective

we argue that alternative TTIP trade outcomes, based on being part of global supply chains, are speculative.

- We argue that the best indicator to date of a country's involvement in global supply chains is a detailed construction of that country's trade-weighted Grubel-Lloyd index at the 5-digit level (see figure 6-8).

*Figure 6-8 Grubel-Lloyd index per country; trade-weighted average, 5-digit level*




Motivation: Since supply chains mostly involves two-way trade in the same sector, a first indicator of a country's involvement in international supply chains is based on calculating a trade-weighted average Grubel-Lloyd index of intra-industry trade. This index has a value of zero if there is no trade within the same sector, and one if trade only consists of trade within the same sector.

In figure 6.8 income is measured along the horizontal axis. For the poorest countries in the world the G-L index is very small; in other words they participate in global supply chains only marginally. There are 47 LOW income countries included in Figure 6-8. They all have a low GL index, the variation in these scores is minimal, and there is no discernable increase within this group as income per capita rises.

- When we relate this indicator of supply chains at the country level with an indicator of economic development, we find that LOW income countries do *not* take part in global supply chains. Only once the income per capita level reaches a minimum threshold level, which coincides almost perfectly with our boundary between LOW and LoMID income

country groups, can a country start to take part in global supply chains. Note that for most resources (resource rich countries) alternative suppliers are readily available.

- As a consequence any advantageous or disadvantageous claims associated with TTIP related to taking part in global supply chains are irrelevant for LOW income countries.

A general conclusion is that TTIP has positive and significant trade effects for third countries, especially LOW income countries. Some provisions have negative effects (trade diversion), some positive (trade creation). Also, for some countries, with traditionally strong trade ties to the EU, income effects of TTIP (demand from TTIP partners) add to the positive effects of trade creation or compensate negative trade diversion effects.

RTAs differ by design. These differences are captured using a unique dataset on the contents of RTAs. Our analysis reveals that provisions come in ‘clusters’; if you see provision *A* then provision *B* is also very likely to be present in the same RTA. For TTIP negotiators reaching agreements over groups of provisions is probably more beneficial than on a provision-by-provision negotiation. In particular the following groups have positive (and separate) effects (in order of – statistical- importance):

*Broad institutions*

- Consultations (conduct dialogue "with a view to finding a mutually satisfactory solution")
- Definitions (formulate definitions of key concepts)
- Dispute settlement formulate dispute settlement procedures)
- Evolutionary clause (include periodic review mechanism that facilitates amendments)
- Institutional framework (develop institutional framework that will be used to oversee implementation)

*Broad competition*

- Agriculture (liberalize trade in agricultural commodities)
- Capital mobility (remove restrictions on capital mobility)
- Competition (guard against or correct practices which may distort competition)
- Import restrictions (liberalize duties, charges and/or quantitative restrictions)
- Investment (develop facilitative transparent and competitive investment regime)
- SPS (apply regulations in sanitary and phytosanitary matters in a non-discriminatory fashion)

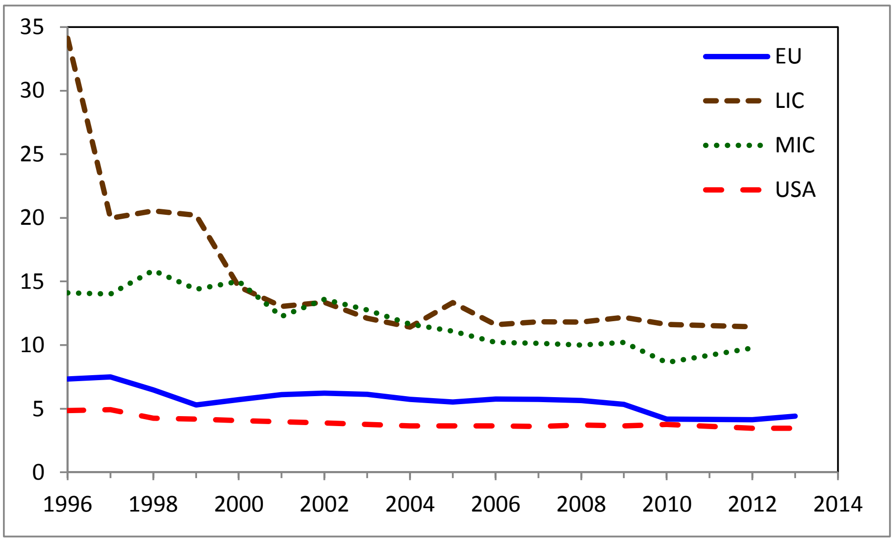
*Broad government*

- ADCVM (set rules on anti-dumping and countervailing measures)
- Customs administration (harmonise customs policies and procedures)
- Export restrictions (liberalize duties, charges and/or quantitative restrictions)
- Public procurement (grant access to contract award procedures not less favourable than companies of any third country)
- State aid (restrict any form of aid)

# 1 INTRODUCTION

Free trade, in general, is beneficial for global welfare. It allows countries to specialize according to comparative advantage and benefit from the division of labor.[2] Despite this notion, in practice perfect free trade never exists. All sorts of barriers to trade obstruct the free movement of trade flows and prevent an optimal level of international division of labor and allocation of capital. Some of these trade obstructions are deliberate measures taken by governments, such as import tariffs, export subsidies, and all sorts of non-tariff barriers that are aimed at reducing competition from abroad. Others are just a fact of life, but still affect international competition and international trade. One can think of different languages between trade partners, cultural differences, taste differences, or trading distances. Trade negotiations try to reduce the policy induced trade barriers in order to stimulate trade and boost the global division of labor and efficient capital allocation. This is one of the main tasks of the World Trade Organization (WTO), besides dispute settlement. As illustrated in Figure 1-1 based on tariff data the WTO has been successful: tariffs are low, especially for the EU and the USA. They have also been substantially reduced over time, particularly for low- and middle-income countries. Nonetheless, for the latter group tariffs are roughly twice as high as for the EU-USA.

*Figure 1-1 Tariff rate; MFN sample mean, all products (%)*




Source: based on data from World Development Indicators; EU = European Union; LIC = Low Income Countries; MIC = Middle Income Countries; LIC and MIC based on World Bank definitions of country groups.

[2] Paul Krugman (1992), citing Paul Samuelson, pointed out that the theory of comparative advantage 'is one of the few ideas in economics that is true without being obvious (p.106).'

One of the guiding principles of the WTO is the so-called Most Favored Nation (MFN) principle; this principle extends trade concessions between a limited number of countries to all members of the WTO. This principle ensures that trade concessions are always steps in the direction of global free trade.

Regional Trade Agreements (RTAs) are an exception to the MFN clause; concessions between countries in an RTA are exempt from the MFN principle. RTAs are seen as a – sometimes necessary – step towards global free trade. The number of RTAs has increased rapidly over the last 25 years. At the same time negotiations within the WTO framework have become less successful as the continued, seemingly endless, Doha-round negotiations vividly illustrate. The success of RTAs might be at the expense of the multilateral WTO negotiations (see Aggarwal and Evenett, 2015). The recent experience suggests that negotiating with a limited number of trading partners in an RTA is more effective than lengthy negotiations with 161 (current) WTO members.

*Table 1-1 The power of the TTIP countries, 2011*

| | Share of country group in world total (percent) | | | |
|---|---|---|---|---|
| Country group | import | export | income | population |
| TTIP countries | 47.3 | 43.2 | 35.6 | 12.1 |
| EU countries | 34.0 | 34.2 | 18.3 | 7.4 |
| USA | 13.3 | 9.0 | 17.3 | 4.6 |
| RoW countries | 52.7 | 56.8 | 64.4 | 87.9 |
| ADV countries | 21.7 | 24.8 | 14.0 | 4.6 |
| HiMID countries | 4.5 | 4.9 | 6.9 | 4.5 |
| MID countries | 17.8 | 20.0 | 27.5 | 31.5 |
| LoMID countries | 7.1 | 6.2 | 14.0 | 33.5 |
| LOW countries | 1.6 | 0.8 | 2.0 | 13.8 |

Source: calculations based on trade data and World Development Indicators; world total is based on 168 countries (with a total population of 6.825 billion people representing 96 percent of the true world total). MID = average income countries, LOW = Low income countries, ADV = high income countries (A for advanced), transition countries: from Low to MID = LoMID and from Hi to MID = HiMID (see discussion Table 2-1); TTIP = Transatlantic Trade and Investment Partnership; RoW = Rest of World.

Currently the USA and the EU are negotiating a new RTA: The Transatlantic Trade and Investment Partnership (TTIP). After the official announcement in February 2013, the negotiations started in July 2013, and are still ongoing.[3] If successful, TTIP will be the largest RTA to date, as illustrated in Table 1-1. The TTIP countries represent 47.3 percent of the

[3] See for detailed information: http://ec.europa.eu/trade/policy/in-focus/ttip and https://ustr.gov/ttip

world's imports, 43.2 percent of the world's exports, 35.6 percent of the world's total income (PPP), and 12.1 percent of the world's total population. The economic importance of the TTIP countries regarding income and trade flows is therefore substantial. The non-participating 'Rest of World' (RoW) countries represent almost 90 percent of the world population and a little more than half of the world trade flows. We have subdivided these countries into five different income groups in Table 1-1, as discussed in chapter 2.

The European Commission expects positive welfare effects for the members of TTIP and is also confident that most third country effects will be positive. TTIP envisages to:

- Eliminate or reduce tariffs and tariff-rate quotas
- Eliminate, reduce, or prevent barriers to trade in goods and services
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- Enhance compatibility of regulations and standards
- Eliminate, reduce, or prevent unnecessary "behind the border" Non-Tariff Barriers (NTBs)
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- Enhance cooperation for the development of rules and principles on global issues
- Achieve of shared global economic goals of common concern

The Commission's assessment of the benefits of TTIP was based on a highly influential study carried out by the CEPR on behalf of the Commission (Francois et al., 2013). Based on this study it is concluded that many sectors will see their export levels increase (metal +12%; food +9%; chemicals +9%; manufactured goods +6%; transport +6%; motor vehicles +40%; agriculture +0.06%). Possible negative effects for other sectors are limited. Wages are expected to rise by 0.5%. Together with lower prices for tradable goods, the disposable income of a typical household of four persons will increase by € 500. Importantly, also for trading partners around the world a positive total income effect is expected of around € 99 billion as growth in the EU-USA stimulates demand across the world. In addition, the removal of non-tariff barriers (NTBs), will make it easier for third countries to trade with the EU and the US. By and large these findings for the EU-USA are corroborated by other studies (see for a recent survey Felbermayr et al., 2015). However, third country effects are less certain, despite the positive findings of Francois et al. (2013) in this respect. In Felbermayr et al. (2013), for example, third country effects are negative and also differ widely between groups of third countries. Felbermayr et al. (2013) is, however, explicitly questioned by the European Commission in a memo discussing and summarizing the effects of TTIP. The study

was relatively quickly dismissed because it uses a mix of partial equilibrium modelling and econometrics, and the numbers simply seem to be 'beyond belief.'[4] The swift dismissal of these findings is noteworthy as other studies also show negative effects of TTIP for third countries (see Capaldo, 2014, Felbermayr et al., 2015 for a survey; most studies in the survey show negative third country effects). Furthermore, negative third country effects of RTAs have a long and respectable history in economic theory; only under special circumstances can negative third country effects of an RTA be circumvented (see section 2.1). These effects are important, because in the case of a partnership between the EU-US many 'third' countries are developing countries. If, indeed, TTIP might have negative effects on developing countries, this initiative would on the one hand stimulate economic growth in the EU and the USA, but on the other hand frustrate the EU development agenda. This adverse possibility has not gone unnoticed and increasingly is the topic of a growing body of research (see also Sait Akman et al., 2015). Our study fits into this line of research on the possible effects of TTIP for third countries.

We will take a closer and quantitative look at third country effects of TTIP and focus on the possible effects on various groups of developing countries. Our contribution is two-fold.

First, we use the gravity equation of international trade to estimate the effect of Regional Trade Agreements (RTAs) on international trade flows. We focus on the implications of trade liberalization for trade flows between low-income countries (LICs), the EU, and the US. The standard method to estimate the effects of RTAs is first to use a gravity model to calculate the trade impact of *existing* RTAs, and then to use these quantitative estimates to calculate the – hypothetical – effects of a potential regional trade agreement between countries that consider implementing such an agreement. In a way this is a 'one size fits' all method in the sense that quantitative estimates of existing RTAs are assumed to hold in general and also apply to new agreements. This is a useful method, but ignores differences between RTAs.

The traditional estimates of the effects of RTAs, almost without exception, use a binary dummy variable to indicate whether an RTA is present or not. If an agreement is present the value of the indicator equals 1. If there is no agreement the value is 0. The use of a binary variable that only accounts for the presence of an agreement between pairs of countries has

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[4] See: http://trade.ec.europa.eu/doclib/html/151787.htm. In this memo it is also put forward – as criticism – that the Felbermayr et al. (2013) study uses experiences of previous integration agreements as benchmark for future performance (see section 3.4).

the virtue of simplicity but ignores heterogeneity in terms of institutional design, content, and legal enforceability of regional trade agreements. We intend to deal with this heterogeneity explicitly and link these differences to their potentially different impact on international trade. Using the heterogeneity of regional trade agreements enables us to distinguish between various elements within these agreements. To this end we use a database that includes all existing (that is: 296) RTAs documented by the WTO and for which detailed information is available. The reason to use an extensive database is to maximize information on RTA heterogeneity. The novelty of the approach is that we include a fine-grained measure that is sensitive to the policy areas contained in RTAs. The measure distinguishes between different policy domains such as measures regarding: agriculture, anti-dumping and countervailing measures, capital mobility, competition, customs administration, environment, export restrictions, import restrictions, intellectual property rights, investment, labour, public procurement, services, sanitary and phytosanitary measures (SPS), state aid, state trading enterprises, and technical barriers to trade.

Using several elements of RTAs that describe heterogeneity, we can calculate how each element affects international trade differently. We can, for example, differentiate quantitatively between regional trade agreements with SPS and TBT measures and agreements without these measures. This makes it possible to assess the effect of harmonizing non-tariff barriers such as SPS measures and TBTs on international trade flows.

Third countries might also be affected through a supply chain channel. Increased trade between the EU-USA because of TTIP could also stimulate trade between the EU-USA and third countries through supply chain linkages. This could neutralize potential trade diversion aspects. On the other hand, intermediate suppliers located in either the EU or USA might gain competitiveness relative to intermediate suppliers from third countries. To assess – the net effect of – these linkages we use the WIOD database that describes supply chain linkages to a certain extent. The WIOD trade data identify 40 individual countries and a ‘Rest of the World’ (RoW) group of countries to characterize global trade flows in the period 1995–2009.[5] The countries are the 27 countries of the EU (January 1, 2007), and Australia, Brazil, Canada, China, India, Indonesia, Japan, Mexico, Russia, Taiwan, Turkey, and the USA. Together these countries represent about 85% of world GDP. These data cover 35 sectors and are

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[5] See: www.WIOD.org

constructed by combining national Input-Output tables with international trade data. These tables allow us to get a rough estimate about the importance of this channel. We explicitly mention 'rough' as the WIOD data are less detailed than the standard gross export data sets. These supply chain indications show the potential how trade liberalization might affect supply-chain trade for developing countries (Baldwin and Taglioni 2011; Timmer et al. 2014).

Our findings can be summarized as follows:

- In general the consensus in the literature is that TTIP might affect third countries negatively. An exception is the important study of Francois et al. (2013) which was pivotal for the European Commission to engage in TTIP negotiations. Third country effects are, however, difficult to assess as many Regional Trade Agreements exist between the EU-USA and third countries, trade has become more complex due to supply chain linkages, and Regional Trade Agreements are fundamentally heterogeneous.
- A systematic analysis of 296 Regional Trade Agreements show that these agreements are heterogeneous. Provisions can be labeled as so-called $WTO^{+}$ provisons (part of WTO mandate), $WTO^{x}$ provisions (not yet part of WTO mandate), and provisions that deal with Institutional Quality.
- Using a gravity approach we determine that various agreement provisions have different implications for trade; some positive, some negative, and some no effect at all. The standard way RTAs are covered in the literature neglect this important qualification of the effects of trade agreements.
- The variation of TTIP effects for different groups of countries is substantial. Most importantly for this study is that trade effects for the LOW income group is, generally, positive. Particularly for most African countries, such as Togo and Ethiopia (with Chad as an exception). The effects are still negative, however, for some poor Asian (Cambodia) and American (Haiti) countries.
- The above conclusion is reinforced is one realizes that provisions come in clusters and mutually support each other: the positive trade effects become larger, and the negative trade effects less.
- Supply chain linkages indicate that it is unlikely that supply chain linkages are a strong force to mitigate possible negative trade diversion effects.

The set-up of this study is as follows. In Chapter 2 countries are grouped, from low to high income groups. Chapters 3 and 4 discuss and motivate the importance of Regional Trade

Agreement heterogeneity. Chapter 5 discusses the possible TTIP (counterfactual) trade results for various groups of countries. Chapter 6 provides stylized facts on supply chains and motivates that additional trade effects associated with global linkages are small. Chapter 7 concludes (readers familiar with World Bank classifications, trends in RTAs, the literature on third country effects can directly start with chapter 4).

## 2 LOW INCOME COUNTRIES

Before we can determine the economic impact of TTIP on Low Income Countries we first have to determine which countries are included in this group. Two observations are important in this respect.

First, statistical information regarding the total production of goods and services in a particular country in a given year is, of course, based on the value of these goods and services in local currency. We cannot convert these estimates into a common currency, say US dollars, using the average exchange rate between the currency and the dollar in this period. The main reason is that the prices of non-tradable goods and services, such as housing or getting a haircut, are considerably lower in developing countries than in advanced countries when simple exchange rates are used. As a consequence, the value of production in developing countries tends to be underestimated compared to advanced countries. To correct for these differences, the United Nations International Comparison Project (ICP) collects data on the prices of goods and services for virtually all countries in the world and calculates 'purchasing power parity' (PPP) exchange rates, which better reflect the value of goods and services that can be purchased in a country for a given amount of dollars. Our discussion and classification will thus be based on PPP values (in constant 2011 international dollars) from the World Development Indicators as provided by the World Bank (2013).

Second, poverty is a dynamic concept. Whether your income is low and should be classified as poor depends on whom you compare it to and in what time period. At the global level, income per capita increased by about 60 percent in the period 1990 to 2013, namely from $8,744 to $14,013. If your income level was stagnant during this period, say at $8,744, then you would have an average income level in 1990, at 100 percent of the world average, but be considered one of the poorer nations in 2013, at 62 percent of the world average. It thus makes sense to determine the performance in your country in a given year by comparing it to the world average income level in that year. The differences are large. Using the most recent observation available in the period 2011-2013, several countries have an income level that is

only five percent of the world average, including Burundi, D.R. Congo, Liberia, and Malawi. Similarly, several countries have an income level higher than 600 percent of the world average, or more than 120 times as high, including Kuwait, Macao, and Qatar. The average person in Macao thus earns more in one month than the average person in Burundi earns in ten years' time.

*Table 2-1 Classification of countries in five income categories*

| | Percent of world average | | | Number of | Population | Percent of | Percent of |
|---|---|---|---|---|---|---|---|
| Class | From | To | Range | countries | (million) | population | income |
| LOW | 0 | 30 | 30 | 49 | 959 | 14.0 | 2.1 |
| LoMID | 30 | 70 | 40 | 41 | 2,299 | 33.5 | 14.1 |
| MID | 70 | 130 | 60 | 35 | 2,180 | 31.8 | 27.9 |
| HiMID | 130 | 220 | 90 | 28 | 412 | 6.0 | 9.4 |
| ADV | above 220 | | | 32 | 1,012 | 14.7 | 46.5 |
| Total | | | | 185 | 6,862 | 100 | 100 |

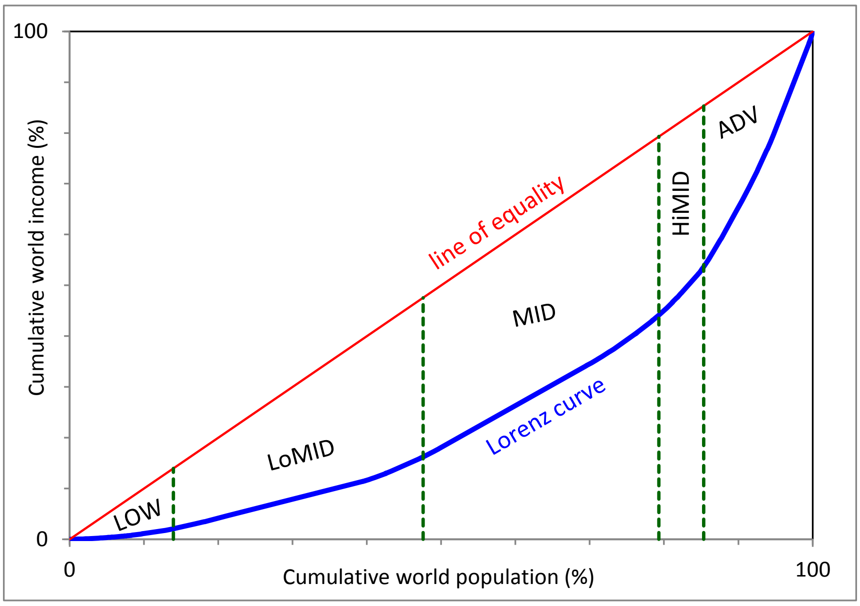
Source: based on: World Development Indicators; GNI per capita PPP in constant 2011 $, most recent observation in the period 2011-2013; the 185 countries represent 96 percent of the world population.

On the basis of the above discussion we decided to classify the countries for which the World Bank (2013) has the relevant information available into five groups. This number is, of course, arbitrary. We prefer an uneven number of groups, so there is a middle group of 'average' countries, which we refer to as MID. We also need at least three groups to be able to identify a group of very low income countries, which we refer to as LOW, and a group of very high income countries, which we refer to as ADV (for advanced). Identifying five groups allows us to have a transition from LOW to MID and from MID to ADV, we refer to these groups as LoMID and HiMID, respectively. Identifying seven groups would, we believe, paint a too complicated picture.

We now have two options available, namely (i) determine the five groups using quintiles with an even number of countries in each group or (ii) determine the groups based on fixed cut-off percentages relative to the world average. The disadvantages of option (i) are that the countries differ substantially in population size and that there are by construction *always* five groups. Suppose, for example, that all the countries in the world have an income level in

between 90 and 110 percent of the world average. Then these deviations are so small that we would put them all together in one group. We thus decided on the second option and, after some experimenting, decided to construct them as follows. The LOW income group consists of all countries with an income per capita below 30 percent of the world average. The range of this group is thus 30 percentage points. The next groups are based on the range of the previous group plus 10, 20, and 30 percentage points, respectively. The remaining countries are in the ADV group.

*Figure 2-1 Global income inequality, 2013*

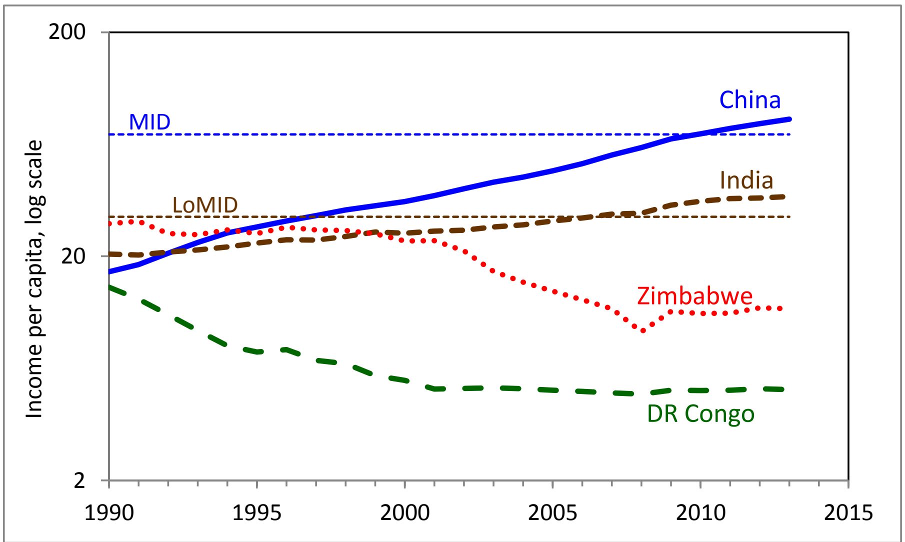



Source: based on data from World Development Indicators; income measured in PPP (constant 2011 international dollars), most recent available in 2011-2013; 185 countries included (96 percent of the world population).

Table 2-1 shows the results of our methodology. There are 49 countries in the LOW income group, ranging from 0 to 30 percent of average world income, together accounting for almost one billion people, including Ethiopia and Bangladesh. There are 41 countries in the LoMID income group, ranging from 30 to 70 percent of average world income, together accounting for 2.3 billion people, including India and Nigeria. There are 35 countries in the MID income group, ranging from 70 to 130 percent of average world income, together accounting for 2.2 billion people, including China and Brazil. There are 28 countries in the HiMID income group, ranging from 130 to 220 percent of average world income, together accounting for 0.4 billion people, including Turkey and Russia. Finally, there are 32 countries in the ADV income group, from 220 percent of average world income and above, together accounting for one billion people, including Japan, Germany, and USA. Both the LOW and ADV income group thus account for about one billion people.

Ignoring within-country income inequality we can illustrate the uneven distribution of income across the world using a Lorenz curve, see Figure 2-1. We order the countries from low to high average income per capita levels. On the horizontal axis we then measure the cumulative percentage of world population and on the vertical axis the cumulative percentage of world income. This is labeled the Lorenz curve in Figure 2-1. If everyone in the world earned the same income level the Lorenz curve would coincide with the 45° line, labeled the line of equality in Figure 2-1. The area in between the line of equality and the Lorenz curve is thus a measure of the degree of income inequality, known as the Gini coefficient (twice this area, to be precise, resulting in an index between 0 and 1). Figure 2-1 is derived on the basis of all the individual countries, but it also shows the distribution of the groups identified in Table 2-1. As a whole the LOW income group consists of 14 percent of the world population and earns 2.1 percent of the world's income level, equivalent to 15 percent of the world average. In contrast, the ADV group consists of 14.7 percent of the world population and earns 46.5 percent of the world's income, equivalent to 3.15 times the world average. The income level per capita in the ADV group is thus on average 21 times higher than in the LOW group, 7.5 times that of the LoMID group, 3.6 times that of the MID group and 2.0 times that of the HiMID group. In our discussions we focus on the countries in the LOW and LoMID group as Low Income Countries. Together these two groups account for 48 percent of the world population. We will occasionally also draw attention to countries in the MID group when we discuss, for example, the economic consequences of TTIP for China or Brazil, but this is not the focus of our analysis.

*Figure 2-2 Income per capita relative to world average, selected countries (%)*




Source: based on data from World Development Indicators; GNI per capita PPP in constant 2011 international $ as a percent of the world average GNI per capita; LoMID line is 30 percent; MID line is 70 percent.

As a country successfully develops and becomes an 'emerging' country it can cross the boundary between two income groups. This is illustrated for China and India in Figure 2-2. Both countries were in the LOW group in 1990 at 17 percent of world average income for China and 20 percent for India. Since then China moved into the LoMID group in 1997 and into the MID group in 2010, with a current income level at 82 percent of the world average. India emerged slower, moving up to the LoMID group in 2007, with a current income level at 37 percent of the world average. Other countries see a decline in their income levels relative to the world average. This holds, for example, for Zimbabwe and DR Congo, see Figure 2-2. Both countries remained in the LOW group and saw their income levels decline from 28 percent to 12 percent (Zimbabwe) and from 15 percent to 5 percent (DR Congo).

# 3 REGIONAL TRADE AGREEMENTS AND THIRD COUNTRIES

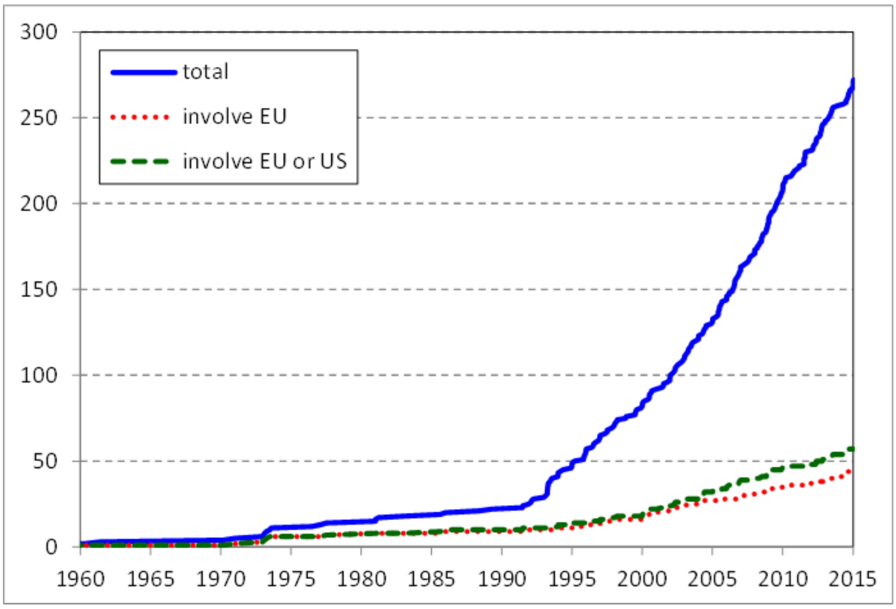
## 3.1 Regional Trade Agreements

Analyzing welfare effects of Regional Trade Agreements (RTAs), also for third countries, has a long research history in international trade theory. Central in the argumentation is that a RTA prevents members to extend trade concessions to non-participating members. Viner (1950) was the first to show that welfare effects might be negative as a result of two contrasting effects: the positive trade-creation effect and the negative trade-diversion effect. Trade creation is the increase in trade between member countries because of the abolishment of tariffs after an RTA is negotiated (a lower outside tariff might also increase trade between non-member countries). Trade diversion occurs if an RTA causes member countries to import from each other rather than from a cheaper non-member country since the outside tariff makes imports from non-members more expensive than intra-bloc imports. The net welfare effect of trade creation (positive) and trade diversion (negative) can be negative.[6] In practice, the Vinerian analysis points towards the reasons of possible negative third country effects. These effects are hard to predict, or even to calculate. In case of TTIP, for example, many third countries are part of an RTA themselves, and many of these RTAs are with the EU, the USA,

[6] The so-called Kemp-Wan theorem gives the condition for the net effect to be positive: if trade with non-bloc members is fixed after the RTA is effective, the trade creation effect dominates (the outside tariff might have to be changed to keep imports from non-bloc members constant). The WTO regulations however, stipulate that the average level of outside tariffs should not become higher after the FA has taken effect: this is neither necessary nor sufficient to make the net effect positive (see Feenstra, 2004, for a discussion).

or both (implying low or absent tariffs, see also Map A-1 in the Appendix for more detailed information on the EU).

*Figure 3-1 Number of RTAs still in force in 2015, by date of entry into force*

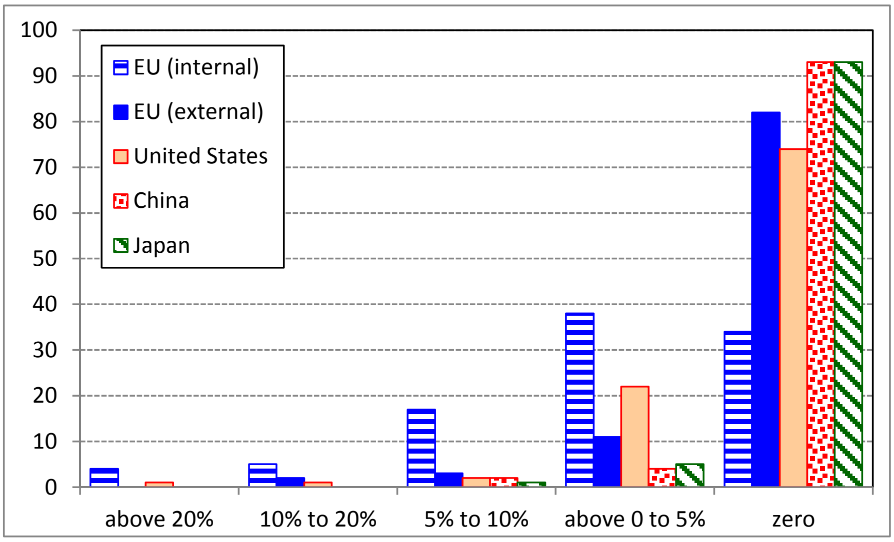



Source: based on WTO data, 12 May 2015; if more than one date of entry into force is listed the first date is taken.

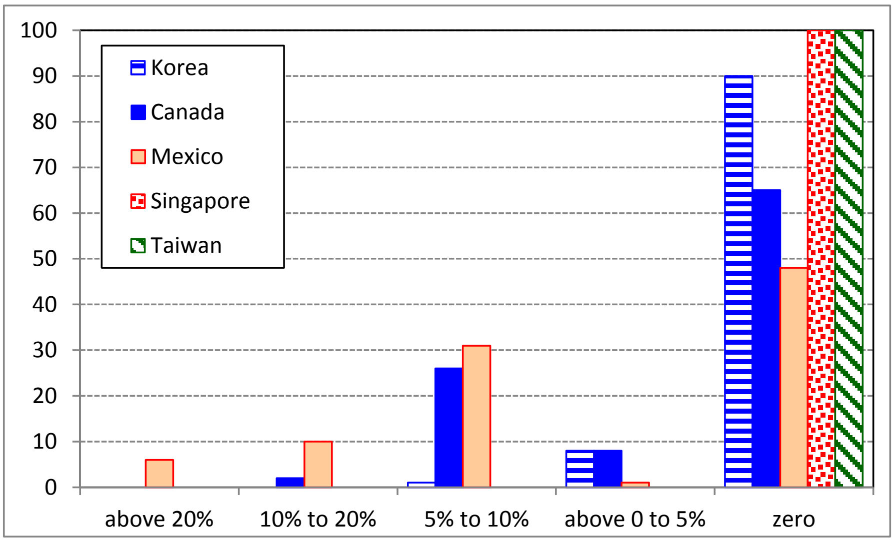
The WTO allows RTAs – despite the fact that they violate the Most Favored Nation (MFN) principle – as they view each new agreement as a step towards further free trade. Looking at the number of existing RTAs this policy could be considered a success. As Figure 3-1 indicates, the number of RTAs increased rapidly from the 1990s onward and the total number of RTAs – as acknowledged by the WTO – is now close to 300; the average number of RTAs that a typical WTO member is part of is around 13. The WTO calculated that the share of intra-RTA trade in world trade increased from 18 per cent in 1990 to 38 percent in 2008 (in terms of exports). As of 12 May 2015 the total number of RTAs still in force as notified to the WTO is 272. Figure 3-1 shows that their number increased rapidly since about 1993 (from less than 30). One of the longest still active agreements is the EC Treaty with entry into force on 24 April 1957. Relative to 1 June 2015 this agreement has thus been active for more than 57 years. However, the average still active agreement is only into force for 12.74 years and the median agreement exactly 10 years. Figure 3-1 also provides an indication regarding the extent to which the European Union (EU) and the United States (USA) are involved in the active RTAs, by date of entry into force. It shows that both countries were involved early on in still active RTAs. As a consequence the average duration of the active RTAS for the USA is almost twice as long as the average (23.5 years) and for the EU more than four times as long (52.9 years).

*Figure 3-2 Share of imports according to margin of preference (%), 2008*

*a. EU, USA, China, and Japan*




*b. Korea, Canada, Mexico, Singapore, and Taiwan*




Source: based on data from Baldwin (2014), Table 1.

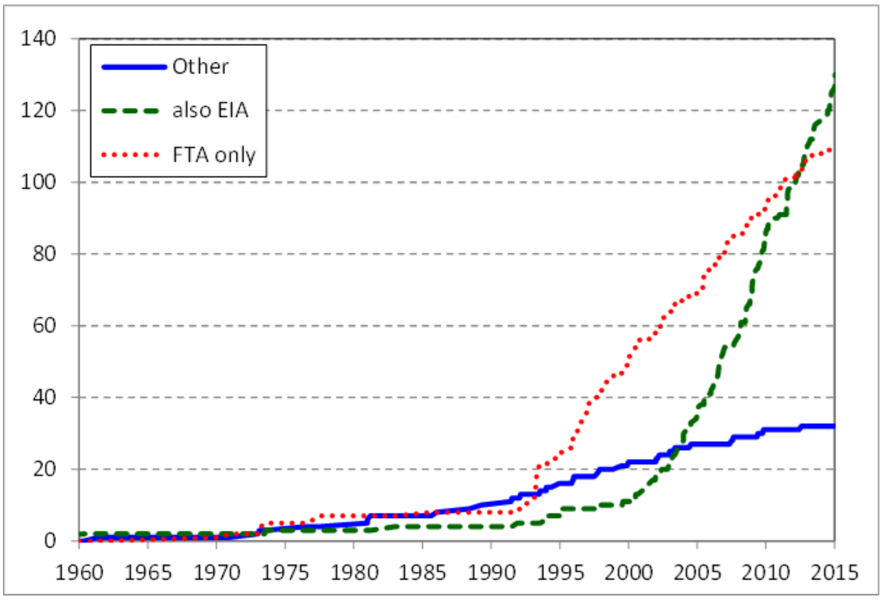
Figure 1-1 illustrates that the WTO, in combination with country initiatives, has been successful in lowering average tariff levels around the world. As explained above, one of the most visible direct effects of an RTA is to give preferential treatment to participating countries. The question then arises why RTAs have become so popular since the 1990s, as illustrated in Figure 3-1, since the preferential treatment of participating countries in terms of tariff levels is declining over time. For advanced countries in particular the imposed tariffs on a large range of products is zero percent, so there is little room for preferential treatment from a tariff perspective. This argument is illustrated in Figure 3-2 using data from Baldwin (2014). He provides estimates of the *de facto* margin of preference, which is the difference between the tariff applied to imports from RTA partners as opposed to non-RTA partners, for a large range of countries. We illustrate this in Figure 3-2 in panel *a* for the EU (both internally and

externally), the USA, China, and Japan, and in panel *b* for Korea, Canada, Mexico, Singapore, and Taiwan. For all countries (except for Mexico and the EU internally) the share of imports for which the margin of preference is actually zero exceeds 60 percent of all imports. For a modest share of imports the margin of preference is in the positive-but-lower-than-5 percent range. The share for which the margin of preference is higher than 10 percent or 20 percent is very low for all countries, except Mexico. To understand why signing RTAs has become so popular despite these small margins of preference we take a closer look at the type of RTAs negotiated on in the 21st century.

### 3.2 Type of Regional Trade Agreements

The WTO provides information on four main types of RTAs, namely, in order of increasing economic integration: (i) Partial Scope Agreements (PSAs), (ii) Free Trade Areas (FTAs), (iii) Customs Union (CU), and (iv) Economic Integration Agreements (EIAs). Figure 3-3 shows that since the 1990s there was a sharp rise in FTAs. Since the new millennium, however, there is a sharp increase in the more complicated and more detailed EIAs. Modern RTAs therefore look beyond margins of preference towards other aspects that are important.

*Figure 3-3 Type of RTA still in force in 2015; number, by date of entry into force*

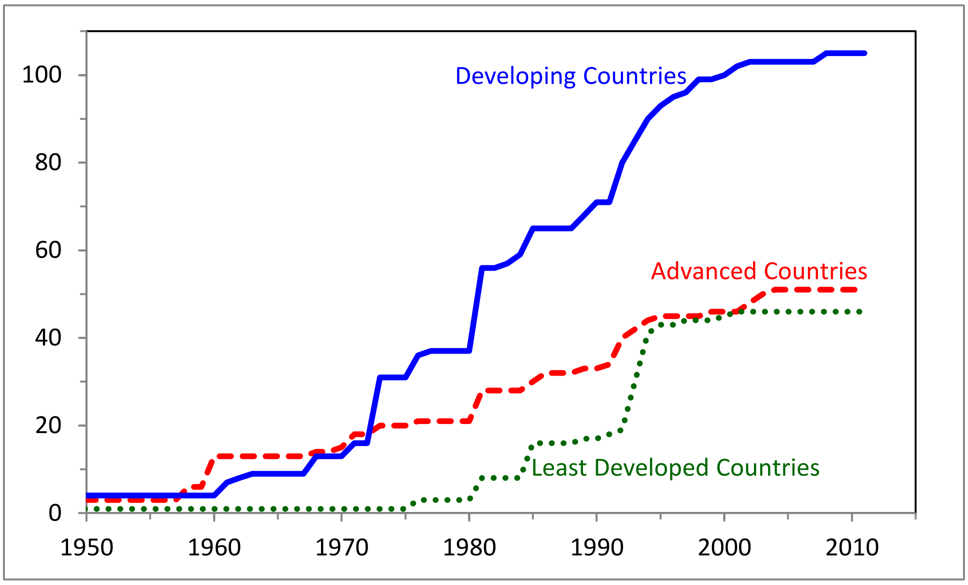



Source: based on WTO data, 12 May 2015; if more than one date of entry into force is listed the first date is taken.

Issues that play a role in the deeper EIAs include, for example, customs, export taxes, the movement of capital, services trade, state aid, state trading enterprises, intellectual property rights, technical barriers to trade, competition policy, and so on. See chapter 4 for a more complete discussion of these issues. Baldwin (2014) argues that the changes over time in the

type of RTAs reflect the developments in global supply chains (see also section 3.4 below), which requires (i) co-ordinating internationally dispersed facilities (a continuous two-way flow of goods, people, ideas, and investments) and (ii) producing abroad (limiting exposure to international risks for capital and technical, managerial, and marketing know-how). As a consequence of these changes, the role of developing and emerging markets in global supply chains is increasingly reflected in the number of RTAs, as illustrated in Figure 3-4. The new entrants in the 1990s mainly involved developing nations and least developed countries (LDCs). This has set the stage for an explosive number of trade agreements involving advanced and developing countries and involving only developing countries. Interestingly, the relative decrease in agreements between advanced countries suggests that these agreements have been expanded to include developing members. However, plurilateral agreements with members from all levels of development are scarce, as are agreements between advanced countries and LDCs.

*Figure 3-4 Development status of RTAs*




Source: Authors' calculations based on WTO data; labels based on Worldbank classification.

To summarize: we find that the period leading up to the 1990s can be characterized by intra-regional agreements that are pluri-lateral in nature and that involve mainly advanced countries. Since the 1990s, the picture has become much more complex. Some countries are engaged in several agreements of various sizes; others only have one or two agreements. Although plurilateral agreements are growing, approximately 60 percent of all trade agreements are bilateral. With almost all countries having had at least a small taste of having a trade agreement, also trade agreements are becoming more diverse in terms of their participants' development status.

## 3.3 Shallow versus Deep Integration

Complex member networks and different forms of RTAs make a general conclusion regarding trade creation and trade diversion difficult. Traditionally the analysis with respect to trade creation/diversion takes a quite simple view on trade integration; it only looks at the effect of import tariffs for members versus non-members. In practice economic integration is subtler, not only in terms of agreements that countries have but also in terms of content. Baldwin (2008), for example, highlights three aspects of integration that go beyond the simple tariff discussion: (i) preference-erosion, (ii) goodies-bags, and (iii) cherry-picking.

*Preference-erosion*. In violation of the MFN principle both the EU and the USA give certain developing countries a preferential treatment on their respective markets (the so-called Generalized System of Preferences, or GSP). This system gives developing countries a competitive boost on either the EU market or the US market they are shielded from competition by tariffs between the EU and USA. If TTIP abolishes tariffs between the EU and the USA, the preferential treatment vis-à-vis competitors from either the EU or USA disappears, and within this bloc no preferential treatment is possible anymore. For third countries the trade effect can be negative. A RTA between these developing countries and the EU/USA could compensate these effects.

*Goodies-bags*. An issue related to preference erosion is that especially large countries might give preferential treatment to small and often poor countries in exchange for cooperation on non-economic issues, such as anti-drugs or anti-terror policies. These smaller countries receive better access to the larger market than their competitors. So, the large trade-bloc partner is said to buy a non-economic benefit from a 'bag of goodies.' If these 'goodies' are highly valued a move towards free trade becomes unlikely, as it would abolish the possibility to hand out a preferential treatment. For involved third countries the effect can thus be positive from a trade perspective.

*Cherry-picking*. Members of RTAs self-select into blocs where they gain a lot from bloc formation and lose only little. This does not necessarily have to be related to trade issues, but could depend for example on similar regulations with respect to health issues, legal systems, product specifications and regulations, and so on. Depending on whether countries are insiders or outsiders of a network, the trade effects can be positive or negative, respectively.

*Table 3-1 Shallow versus deep integration*

| Integration level | Type of RTA | Features | Example |
|---|---|---|---|
| Shallow Integration ↑ | Free Trade Agreement (FTA) | Members liberalize internal trade but retain their independent external tariffs | US-Israel FTA |
| | FTA+ | An FTA that harmonizes some beyond the border standards (e.g. environmental standards) | NAFTA |
| | Customs Union | Members liberalize trade within the union and adapt common external tariff against rest of the world | SACU |
| | Common Market | Establishment of the free movement of all factors of production within the RTA including labor and capital | EU |
| | Monetary Union | Establishment of a common currency and completely integrated monetary and exchange rate policy | Euro Area |
| ↓ Deep Integration | Fiscal Union | Establishment of a common fiscal policy | US |

Source: WTO, World Trade Report 2011, Geneva, p.110. RTA = Regional Trade Agreement

This categorization highlights the fact that more recent trade agreements include more than just simple border measures like tariffs, and also include objectives that are related to political economy considerations. One can easily extend this list. For example, agreements on intellectual property rights, investment policies, product standards, competition policies, dispute settlements, and so on. Thus, even once tariffs are abolished trade creation or trade diversion can still be observed, but for different reasons than just a reduction of import tariffs, as divergent institutions and regulations can also form trade barriers. This is now part of a

growing body of literature in which ‘deep integration’ is distinguished from ‘shallow integration’, where shallow integration usually refers to border measures only and deep integration affects not only to border measures but also domestic policies. Table 3-1 illustrates that the distinction from shallow to deep integration is gradual.

### 3.4 Third country effects

Third country effects of trade integration are further complicated by the fact that trade itself has become more complex. This process is characterized by fragmentation of production processes resulting in supply chains that cover large parts of the world. Most discussions on trade creation and diversion aspects of economic integration assume that products are final products and produced within a single country. An RTA could have complicated effects depending on whether the members of a RTA contain intermediate suppliers or not. If RTA partners contain intermediate suppliers that in principle compete with similar suppliers outside the RTA, trade creation and trade diversion is similar to the standard analysis (but refers to a particular fragment in the production process). If, however, a supplier of intermediate products is not within the RTA, the trade creation within the RTA of a certain product could extend itself to the intermediate supplier outside the RTA and the trade creation is potentially felt throughout the global supply chain. So, trade between non-members and members could be stimulated as they are connected by a supply chain. For each fragment in the production process the location of upstream and downstream connections – within or without a RTA – determines trade creation and trade diversion aspects of the RTA.

Orefice and Rocha (2014) show that signing a deeper agreement in production networks increases trade between members by 35 percentage points, and that these effects are higher for automobile parts (+81 percent) and information technology (+56 percent) than for textiles (+20 percent). They also find that a 10 percent increase in the share of production network trade increases the depth of an agreement by 6 percent and that members of a particular supply chain could self-select into a RTA, maximizing trade creation effects without experiencing trade diversion effects. To some extent this could be the case for TTIP; the already large share of trade in intermediate products could increase the likelihood of actually signing the agreement by the EU and the USA and stimulate the depth of the agreement.

The discussion so far indicates that the world of international trade has become more complicated than the simple discussion in Viner (1950). The effects for member countries and non-member countries can therefore only be established either on a detailed case-by-case study, where specific characteristics of RTAs of a country are analyzed, or more general

methods like CGE modeling, gravity model estimates or partial equilibrium methods. It is therefore not surprising that surveys like Ecorys (2012), Caris (2013), Felbermayr et al. (2013, 2015), and the literature cited therein, show relatively large variation of results, because specific circumstances in which the analysis takes place can be crucial; which elements of the agreement are taken into account?, are global supply chains taken into consideration?, etc.

Some general conclusions are nonetheless possible. First, all studies indicate that the effects for the EU and the USA are positive. This is to be expected as they benefit from trade creation related effects. It seems that the export creating effects for the USA are somewhat larger than for the EU. This is caused by the fact that within the EU also trade diversion effects are present. Second, third country effects are found to be small and negative, with the notable exception of Francois et al. (2013); see also Capaldo (2014) for a discussion. Differences between the outcomes can, to some extent, be explained by methodology and methodological assumptions:

- CGE models – such as Francois et al.(2013) – assume full-employment and balanced budgets. These circumstances are rarely present and are strong assumptions.
- CGE models are long-run models and neglect possible short-run adverse effects.
- Parameter choices in CGE models are crucial for the outcomes. Choices regarding price elasticities, for example, determine supply and demand effects. In general, the higher the chosen elasticities, the higher the welfare gains of RTA related reductions of prices of traded goods.
- Assumed effects of TTIP. The agreement has not been signed. Reductions in trade barriers have to be presumed. In practice scenarios are presented with optimistic and more pessimistic parameter settings. Many different choices are possible.
- Related to these issues, NTBs have to be quantified. Only policy related NTBs can be removed by an RTA. Ecorys (2012) assumes a 17 percent tariff cost equivalent of NTBs that can be removed by TTIP. Francois et al. (2013) have more modest tariff equivalents of NTBs (about 50 percent of those of Ecorys, 2012).
- Gravity models are based on past performance and these results are extrapolated.
- As far as gravity models are concerned, RTAs are usually represented in a simple way; a binary dummy that indicates whether a (particular type of) RTA is present or not. The heterogeneity of agreements is neglected.

- Gravity models can easily deal with ‘zero’ trade flows, which is more difficult in CGE models.
- The character of trade has changed; increasingly trade is taking place within a supply chain. Most estimates do not explicitly deal with this aspect of modern international trade.

Regarding the last two aspects this study provides a useful contribution. TTIP is an example of a deep trade agreement. The coverage of topics that are part of the negotiations is broad and the studies discussed above treat these aspects in a rudimentary manner; as a tariff equivalent that represents all sorts of elements that are (potentially) part of the agreement (see, for example, Francois et al., 2013), or a simple binary dummy that indicates whether a (particular variant of) RTA is present (i.e. most gravity studies).  We will also explicitly deal with the changing nature of international trade itself.

## 4. REGIONAL TRADE AGREEMENTS: HETEROGENEITY AND TRADE

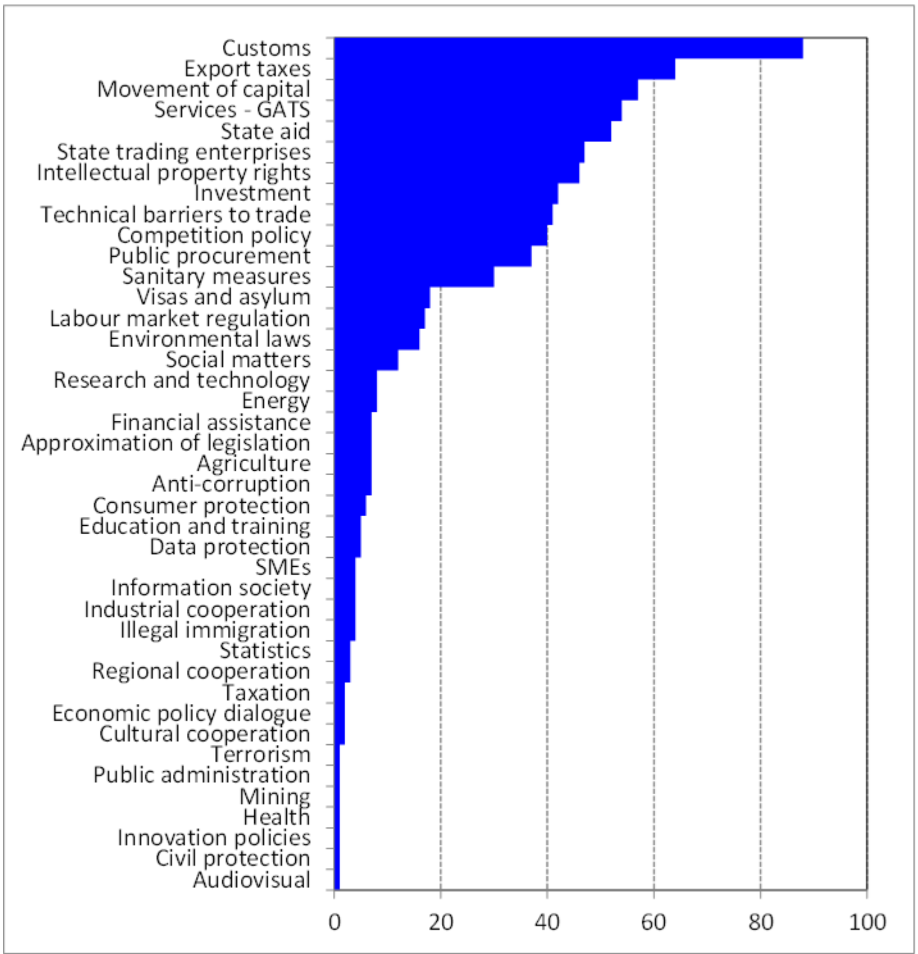
### 4.1 Regional Trade Agreement Heterogeneity

Table 4-1 illustrates that agreements differ with respect to their economic content. A small and growing body of recent research stresses the importance of this aspect of RTAs. Baier et al. (2014), for instance, demonstrate that the extent to which RTAs affect trade flows can be related to the “type” of agreement. They systematically categorize RTAs by their level of economic integration and identify six types of agreements, ranging in depth from non-reciprocal preferential trade agreements (NRRTAs) to more extensive agreements such as reciprocal preferential trade agreements (RPTAs), free trade agreements (FTAs), customs unions (CUs), common markets (CMs) and economic unions (EUs). The authors demonstrate that deeper integration agreements yield stronger trade-promoting effects. However, and this is a contribution of this study, the contents and scope of these groups of RTAs differ widely. The agreements distinguished by Baier et al. (2014) are not homogeneous; in many important aspects they differ within themselves.

Figure 4-1 illustrates the extent of variation in coverage for a sample of 96 RTAs cover issues that deal with direct barriers to trade, but also measures that go beyond simple tariff measures. Almost all RTAs (more than 60 percent of the agreements) include aspects on customs and export taxes. A substantial share of RTAs (between 40 and 60 percent of the agreements) include the movement of capital, services, state aid, state trading enterprises, intellectual property rights, investment, technical barriers to trade, and competition policy. Aspects of

minor importance (between 10 and 40 percent of the agreements) include sanitary measures, visas & asylum, labour market regulation, environmental laws, and social matters. A range of other matters, such as terrorism and cultural cooperation, is only included sporadically in the agreements.

*Figure 4-1 Share of trade agreements covering non-tariff disciplines (%), 2012*




Source: based on data from World Trade Report (2014), Table C9; GATS = General Agreement on Trade in Services; SMEs = Small and medium-sized enterprises; sanitary measures include phyto-sanitary measures.

Many of the items listed in Table 4-1 deal with barriers to trade in different ways and it can be expected that they also affect trade in different ways or intensity. A number of scholars have started opening the black box of RTA heterogeneity. These studies account for heterogeneity in the design of particular RTAs, such as provisions on dispute settlement, investment, services or trade remedies (notably Horn, Mavroidis and Sapir, 2010 (HMS), and Orefice and Rocha, 2014). Indicative findings from this literature tell us that recognizing the design of trade agreements is necessary and describing participation in an RTA using a simple binary variable no longer seems sufficient.

By and large the traditional empirical trade literature, neglects the heterogeneous design of trade agreements explicitly. The use of a binary variable that only accounts for the presence of an agreement between pairs of countries has the virtue of simplicity but ignores heterogeneity in terms of institutional design and legal enforceability.

*Table 4-1 Characterization of Provisions; Coverage and Legal Enforceability*

| Type | Provision | (1) Number covered | (2) Number enforceable | (3) Sample covered (%) | (4) Sample enforceable (%) | (2)/(1) (%) |
|---|---|---|---|---|---|---|
| WTO$^{+}$ | Agriculture | 189 | 188 | 64 | 64 | 99 |
| | Anti-Dumping & Counterveiling Measures (AD & CVM) | 220 | 217 | 74 | 73 | 99 |
| | Customs Administration | 216 | 214 | 73 | 72 | 99 |
| | Export Restrictions | 256 | 256 | 86 | 86 | 100 |
| | Import Restrictions | 292 | 292 | 99 | 99 | 100 |
| | Intellectual Property Rights (IPR) | 191 | 180 | 65 | 61 | 94 |
| | Investment | 162 | 85 | 55 | 29 | 52 |
| | Public Procurement | 172 | 103 | 58 | 35 | 60 |
| | Sanitary and Phytosanitary Measures (SPS) | 182 | 163 | 61 | 55 | 90 |
| | Services | 168 | 86 | 57 | 29 | 51 |
| | State Aid | 190 | 187 | 64 | 63 | 98 |
| | State Trading Enterprises (STES) | 162 | 149 | 55 | 50 | 92 |
| | Technical Barriers to Trade (TBT) | 187 | 138 | 63 | 47 | 74 |
| WTO$^{X}$ | Capital Mobility | 212 | 212 | 72 | 72 | 100 |
| | Competition | 209 | 181 | 71 | 61 | 87 |
| | Environment | 89 | 66 | 30 | 22 | 74 |
| | Labour | 48 | 43 | 16 | 15 | 90 |
| IQ | Consultations | 238 | 238 | 80 | 80 | 100 |
| | Definitions | 152 | 152 | 51 | 51 | 100 |
| | Dispute Settlement | 242 | 242 | 82 | 82 | 100 |
| | Duration & Termination | 218 | 218 | 74 | 74 | 100 |
| | Evolutionary Clause | 235 | 235 | 79 | 79 | 100 |
| | Institutional Framework | 273 | 273 | 92 | 92 | 100 |
| | Objectives | 267 | 267 | 90 | 90 | 100 |
| | Plan & Schedule | 128 | 128 | 43 | 43 | 100 |
| | Transparency | 162 | 162 | 55 | 55 | 100 |

Source: Kohl et al. (2013), Table 4.

Our purpose is to deal with this heterogeneity explicitly and to link these differences to their potentially different impact on RTAs in general. We use these estimates to quantify different aspects of TTIP.

Building on the methodological approach by HMS our dataset provides a comprehensive coverage of 296 trade agreements for the period 1948-2011. It accounts for 26 trade-related policy domains and distinguishes between provisions that *can* and *cannot* be considered to be legally enforceable commitments in a court of (international) law. Some countries that have a RTA might not be in the WTO; we also include these countries. The trade agreement data are from the World Bank's (2011) Global Preferential Trade Agreements Database (GPTAD). The database covers most of the world's trade agreements. Moreover, it also shows the legal provisions contained in these agreements. A list of these trade agreement is provided in Table A-1 in the Appendix.[7]

For each of the 296 trade agreements, we distinguish 26 different policy areas in trade agreements (see for a motivation, HMS). The first group involve the so-called WTO$^{+}$ provisions that are within the current mandate of the WTO. Among the provisions are: agriculture, anti-dumping & countervailing measures (AD&CVM), customs administration, export restrictions, import restrictions, intellectual property rights (IPR), investment, public procurement, sanitary & phytosanitary measures (SPS), services, state aid, state trading enterprises (STE), and technical barriers to trade (TBT). The second set of policy areas is not yet part of WTO negotiations and labelled WTO$^{X}$ provisions: capital mobility, competition, environment, and labour, however, these are part of RTA. The remaining provisions relate to institutional quality (IQ). These describe how an agreement should be implemented and enforced and for example refer to: information about consultations, definitions, dispute settlement, duration & termination, an evolutionary clause, an institutional framework, objectives, plan & schedule, and transparency. See Table 4-1 for the complete list.

We also distinguish between provisions with "weak" commitments and those with "strong" commitments. Weak commitments are those that use terminology such as "endeavour" or "consider" and indicate that commitments are most likely weak. Also provisions that exclude dispute settlement procedures are considered weak. Provisions in which parties commit

[7] The data can be accessed on: http://www.tristankohl.org/datasets

unambiguously to an agreement – including a dispute settlement - are considered strong. Indications are descriptions such as: "must" and "shall", which usually signal strong commitments. Table A-2 in the Appendix provides an explanation for each of the provisions covered in this study. Subsequently, Table A-3 in the Appendix provides examples of "weak" and "strong" commitments for different policy areas.

An important conclusion from our categorization of most of the world's trade agreements is that there is significant variation in their composition. Table 4-1 counts data with respect to the $WTO^{+}$, $WTO^{X}$ and IQ provisions, respectively. For example, column (1) shows that 292 out of 296, or 99% of trade agreements (column 3) provide at least some coverage of commitments on import restrictions. In contrast, a mere 48 agreements (16%) deal with labour issues. Column (2) and (4) refer to provisions that are legally enforceable. For instance, countries make legally enforceable commitments on export restrictions in 256 out of 296 agreements (86%) while only half of the agreements make credible commitments on state trading enterprises (STEs). Finally, column (5) shows the share of provisions that are legally enforceable, conditional on the provision being covered in a trade agreement. This means that if an agreement has a provision on export restrictions, the probability that this provision is legally enforceable is 100%. However, provisions on investment and services are only legally enforceable in about 50% of the cases that they are covered. Also notice here that provisions on institutional quality always have a score of 100% in column (5) because these provisions are "strong" commitments by definition.[8] As stated above the various elements of the agreements affect trade differently. How different is the topic of the next section.

### 4.2 Heterogeneity and Trade

A well-known and well-established method to analyze the consequences of RTAs is the so-called gravity equation. This is an accepted method to describe and analyze the effects of changes in variables that in some way affect barriers to trade between countries.[9] For the interested reader Box 4-1 gives a derivation of modern gravity specifications. It introduces the specification that is most often used and highlights the importance of the so-called

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[8] Note, that some of the provisions might be correlated in the sense that if provision *A* is part of an agreement, so is provision *B*. In the estimates we explicitly deal with this possibility (using factor analysis) in section 5.6.

[9] See Van Bergeijk and Brakman (2010) for a recent discussion of the current state-of-the-art regarding the gravity equation.

Multilateral Resistance terms (MR- terms) that allow us to calculate (counterfactual) third country effects for changes in RTAs.

*Box 4-1 Derivation of the Gravity model*

This derivation follows Baldwin and Taglioni (2006), as summarized in van Bergeijk and Brakman (2010, p. 9-10). We proceed in 6 steps:

*Step 1:* The first step is an equilibrium equation which says that the value of trade flows from country *i* to *j*, $p_{ij}x_{ij}$, should equal the share, $s_{ij}$, that country *i* has in expenditure of *j*, $E_j$:

$p_{ij}x_{ij} = s_{ij}E_j$, where $p_{ij}$ is the import price from *i* to *j*.

*Step 2:* Assuming the familiar constant elasticity of substitution (CES) demand structure it is straightforward to derive demand for each individual product and calculate $s_{ij}$, explicitly:

$$s_{ij} = \left(\frac{p_{ij}}{P_j}\right)^{1-\sigma}, \text{ where } P_j = \left(\sum_{i=1..N} n_i \left(p_{ij}\right)^{1-\sigma}\right)^{1/(1-\sigma)}$$

Where $P_j$ is the exact price index associated with the CES demand structure; $\sigma > 1$ is the elasticity of substitution between varieties '$n_i$'; N is the number of countries.

*Step 3:* Trade costs are crucial in gravity models. Let $t_{ij} > 1$ indicate all bilateral trade costs from country *i* to *j* (man-made and natural costs), then the price in market *j* equals: $p_{ij} = p_i t_{ij}$, where $p_i$ is the so-called mill price of a product in the market of origin, *i*.

*Step 4:* The gravity model describes total bilateral trade, $T_{ij}$, for industries, or countries, which implies that we have to aggregate across varieties (products):

$T_{ij} = n_i p_{ij} x_{ij} = n_i s_{ij} E_j = n_i \left(p_i t_{ij}\right)^{1-\sigma} \frac{E_j}{P_j^{1-\sigma}}$, where we use $s_{ij} = \left(\frac{p_{ij}}{P_j}\right)^{1-\sigma}$, and the price including transportation costs.

*Step 5:* We assume that all goods are traded so total output of a country *j*, $Y_j$, should equal total sales to all destination countries (including the home country):

$Y_i = \sum_j T_{ij} = n_i (p_i)^{1-\sigma} \sum_j \left(t_{ij}^{1-\sigma} \frac{E_j}{P_j^{1-\sigma}}\right)$, where we use the result in step 4. We can re-write this equation as follows:

$$n_i (p_i)^{1-\sigma} = \frac{Y_i}{\Pi_i^{1-\sigma}}, \text{ where } \Pi_i = \left(\sum_j \left(t_{ij}^{1-\sigma} \frac{E_j}{P_j^{1-\sigma}}\right)\right)^{1/(1-\sigma)}$$

This formulation can now be substituted in the last result of step 4 to get to the next step.

*Step 6:* A gravity model can now be formulated by combining steps 4 and step 5:

$T_{ij} = Y_i E_j \left(\frac{t_{ij}}{P_j \Pi_i}\right)^{1-\sigma}$, which is a basic formulation of a modern gravity equation; a variant of this gravity model is equation (1) in the main text. Important in this expression are the (price) indices $P_j, \Pi_i$ which are the so-called Multilateral Resistance terms. These indices relate the bilateral flow between two countries *i* and *j* to the rest of the world. The price indices reflect price and income changes in the rest of the world that affect trade between *i* and *j,* even when the dyadic variables, such as distance or a common border, do not change. These terms allow us to calculate how changes that strictly speaking only affect the EU and the USA still are felt in the rest of the world.

*Table 4-2 Stylized results from Gravity Estimations*

| Estimates | Median | Mean | Standard deviation |
|---|---|---|---|
| Origin GDP | 0.97 | 0.98 | 0.42 |
| Destination GDP | 0.85 | 0.84 | 0.28 |
| Distance | -0.89 | -0.93 | 0.40 |
| Contiguity | 0.49 | 0.53 | 0.57 |
| Common Language | 0.49 | 0.54 | 0.44 |
| Colonial Link | 0.91 | 0.92 | 0.44 |
| RTA | 0.47 | 0.59 | 0.50 |
| EU | 0.23 | 0.14 | 0.56 |
| NAFTA | 0.39 | 0.43 | 0.67 |
| Common Currency | 0.87 | 0.79 | 0.48 |

Source: Head and Mayer (2015, p.160, Table 3.4); based on 2508 estimates from 159 papers

Table 4-2 presents some typical results from (log-linear) gravity estimates. Economic mass, measured as GDP, contributes positively to trade, whereas distance has a negative influence. Other factors also contribute to (the reduction of) trade barriers; such as common language, (former) colonial ties, being part of an RTA, or having a common currency.

Our claim is that RTA heterogeneity is important. A first look to see whether this is correct is a log-linearized version of a standard Gravity model (see Box 4-1 for a derivation):

$$\ln(T_{ijt}) = \alpha + \beta_1 \ln(GDP_{it}) + \beta_2 \ln(GDP_{jt}) + \beta_3 \ln(distance_{it}) +$$

$$+\beta_4 RTA_{ijt} + \gamma_i F_i + \delta_j F_j + \zeta_t F_t + \varepsilon_{ijt} \quad (1)$$

where $T_{ij}$ is real bilateral imports by importer $i$ from exporter $j$ in year $t$, GDP is nominal GDP and distance is bilateral distance; RTA is a variable that describes various elements of regional trade agreements between the dyad; $F_i$ and $F_j$ are fixed effects to account for multilateral resistance terms, and year fixed effects control for unobserved time-varying phenomena (see Egger and Larch, 2011). The intuition behind equation (1) is simple; the larger the trading partners, and the smaller all sorts of barriers to trade, the larger bilateral trade flows.

Our panel dataset consists of a maximum of 220 countries and covers the years 1948-2011. The dataset is arranged by country-pair and year and balanced by construction, which means that all countries are listed as both importers and exporters for every year even if trade flows are not observed. This yields a total of 220 x 219 x 64 = 3,083,250 potential observations. A list of the countries covered is provided in Table A in the Appendix**.**

Gross nominal trade data are from the IMF Direction of Trade Statistics (IMF 2014). As is common in the international trade literature, our dependent variable is bilateral imports (c.i.f. in US $ millions) rather than exports. Baldwin and Taglioni (2006) warn that deflating trade data by a common price index may bias the regression estimates. Time fixed effects, however, address this issue sufficiently. Nominal GDPs are taken from the World Bank (2013) World Development Indicators. Several variables are from Mayer & Zignano (2011): simple geodesic distance (in kilometres), whether countries share a common major/official language, and whether they share a common border. We also deal explicitly with zero trade flows in order to avoid biased estimates; the extensive margin of trade is covered by a Probit regression and the intensive margin by a Poisson estimation (see Head and Mayer, 2015).

Table A-4 in the Appendix shows results for trade agreement heterogeneity (estimation method follows Baier and Bergstrand, 2007). Table A-4 consists of two panels; panel a and panel b. Panel a refers to various elements within the $WTO^{+}$, $WTO^{X}$, and IQ provisions. Column 1 is the standard way of measuring a RTA (with a dummy that is 1 if a RTA is

present and 0 if no RTA is present), colomn 2 indicates $WTO^+$ provisions, column 3 $WTO^X$ provisions, and column 4 IQ provisions. These results are presented separately. Combinations of $WTO^+$ and $WTO^X$ are presented in column 5 and all provisions in column 6. Panel b repeats this exercise but for the provisions that are 'legally enforceable (the 'e' stands for 'enforceable')." A few conclusions stand out:

- The standard way of looking at RTAs with a simple binary dummy is neglecting the heterogeneity of RTAs, as is immediately obvious by comparing column 1 to all of the other columns.
- Parameter estimates are robust. Various combinations of provisions do not, in a qualitative sense, change the overall picture. The size and sign of coefficients tend to be comparable and robust;
- Enforceable provisions do not – by and large – seem to have stronger effects than provisions in general (enforceable provisions are a sub-set of panel a).
- Importantly, different provisions have different effects; some contribute positively to trade, some negatively. As all provisions are aimed at reducing barriers to trade, the negative entries are puzzling. To some extent these provisions might *signal* the presence of a specific trade issue that affects a particular pair of countries and is the reason that it has become part of an agreement, whereas for other countries this trade issue does not limit trade.

We can use the estimates to try to find indicative trade results for TTIP. Although the agreement has not been signed, potential trade effects related to various elements of TTIP can be assessed.

### 4.3 Regional Trade Agreement Heterogeneity, TTIP, and Counterfactuals

Before evaluating the effects of TTIP we have to translate various elements of TTIP to the $WTO^+$, $WTO^X$ and IQ provisions. The negotiating directives are set out in quite broad terms, but are related to three main elements in the mandate: (i) market access, (ii) regulatory issues and (iii) trade rules. Each of these broad groups consists of sub-groups (see below).[10] Although an agreement has not been signed, the objective of the negotiations is clear.

[10] In particular: http://trade.ec.europa.eu/doclib/press/index.cfm?id=1230
For general details see: http://ec.europa.eu/trade/policy/in-focus/ttip

Market Access

*Tariffs:* As Figure 1-1 shows tariffs between the EU-USA are already low. Still, the ultimate aim is to remove all duties on transatlantic trade in industrial and agricultural products, with special treatment for the most sensitive products.

*Rules of origin:* The EU and USA methods of rules of origin will converge.

*Trade defense measures:* Anti-dumping and anti-subsidy measures consistent with relevant WTO rules.

*Services:* Liberalize services sectors at least comparable to other trade agreements to date. The EU aims for recognition of European professional qualifications in the USA and that EU companies and subsidiaries face similar conditions as domestic companies in the USA.

*Investment:* The aim is to use the MFN principle to the fullest; investment liberalization should match the highest levels of liberalization and investment protection that both sides have negotiated to date in other trade deals. Investment protection, including investor-to-state dispute settlement. This part of the agreement is currently the most contentious. Safeguards will be included to prevent abuse of the system and to maintain the right to control investment protection.

*Public procurement:* The aim is to give access to government procurement markets (at all levels of government) without favoring EU companies.

Regulatory Issues

The regulatory areas are key to TTIP.

Tariffs between the EU-USA are already relatively low, so most gain can be expected at the level of non-tariff barriers. These so-called 'behind-the-border' obstacles, such as different safety standards for cars, are still relatively important and contribute to substantial barriers to trade. If producers like to sell products on both sides of the Atlantic they often have to comply to different local procedures and regulations in order to receive product approval. TTIP aims to reduce these costs, but at the same time tries to uphold high levels of safety, consumer, and environmental protection.

An ambitious agreement on Sanitary and Phyto-Sanitary (SPS) measures is currently negotiated as well as reducing other 'behind-the-border' or non-tariff barriers. The sectors involved include: the chemical sector, automotive industry, ICT, and the pharmaceutical and

other health sectors, such as medical appliances. Also (financial) services are included in these negotiations.

*Table 4-3 Type of Provision covered by TTIP*

| Type | Provision | Covered by TTIP |
|---|---|---|
| $WTO^+$ | Agriculture | Yes |
| | AD & CVM | Yes |
| | Customs Administration | Yes |
| | Export Restrictions | Yes |
| | Import Restrictions | Yes |
| | IPR | Yes |
| | Investment | Yes |
| | Public Procurement | Yes |
| | SPS | Yes |
| | Services | Yes |
| | State Aid | Yes |
| | STE | Yes |
| | TBT | Yes |
| $WTO^X$ | Capital Mobility | Yes |
| | Competition | Yes |
| | Environment | Yes |
| | Labour | Yes |
| IQ | Consultations | Yes |
| | Definitions | Yes |
| | Dispute Settlement | Yes |
| | Duration & Termination | Yes |
| | Evolutionary Clause | Yes |
| | Institutional Framework | Yes |
| | Objectives | Yes |
| | Plan & Schedule | Yes |
| | Transparency | Yes |

Source: Authors interpretation.

It is not the aim that all regulatory divergences will be fully eliminated when TTIP becomes effective but that a gradual path towards regulatory convergence is defined in terms of (enforceable) commitments on targets and deadlines.

Trade rules

*Intellectual Property Rights:* Both the EU and the USA are committed to maintaining a high level of intellectual property protection. Both sides acknowledge the efficiency of their current systems.

*Trade and Sustainable Development:* Social and environmental aspects of TTIP are based on what each side has already negotiated in existing trade agreements.

*Other Globally Relevant Challenges and Opportunities:* In general, both sides want to modernize and simplify trade-related aspects of customs and trade facilitation, competition and state-owned enterprises, raw materials and energy, small- and medium-sized enterprises, and transparency.

The list is broad and not yet agreed upon; other topics might still enter the negotiations. According to the TTIP mandate text: "*The Commission, according to the Treaties, may make recommendations to the Council on possible additional negotiating directives on any issue, with the same procedures for adoption, including voting rules, as for this mandate*".

Table 4-3 formally connects our dataset to TTIP. As might be clear from the broad description of coverage of TTIP, all provisions are potentially covered by TTIP. Enforceability is more difficult. Some aspects of the negotiations to date include terms like 'aim for' which does not signal strong enforceability. In these cases enforceability still has to be negotiated. In the estimates below this is included as a sensitivity analysis. According to us TTIP is one of the most ambitious RTAs to date and covers all aspects described in Table 4-3.

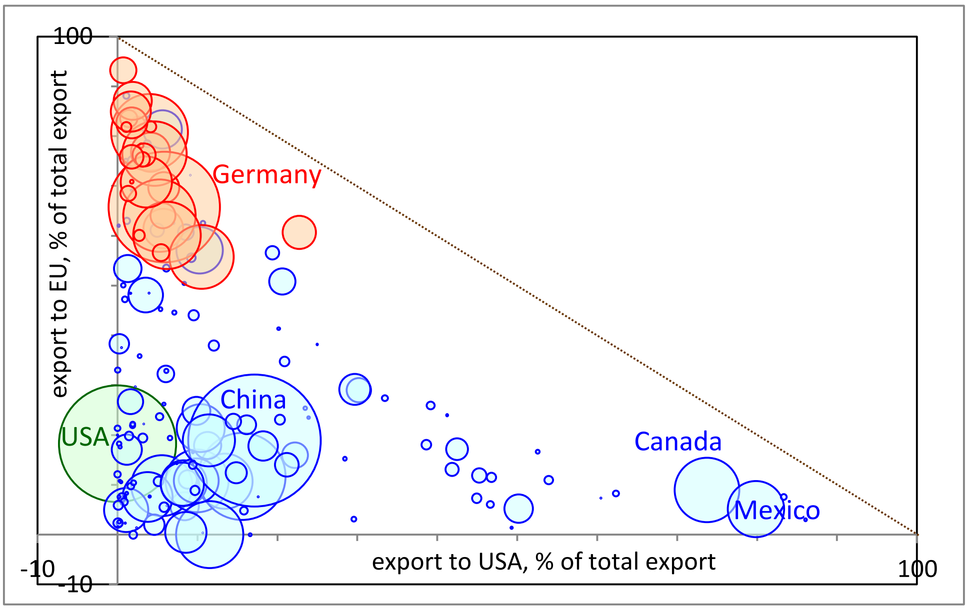
# 5 LOW INCOME COUNTRIES AND TTIP

## 5.1 Trade Flows and TTIP

How important is TTIP for the international trade flows of the EU, USA, and third countries? To get an idea of this importance we calculated the share of each country's international trade flows (both imports and exports) relative to (i) the EU, (ii) the USA, and (iii) the EU and USA combined. Figure 5-1 illustrates the extent to which the trade flows of all countries are directed towards the TTIP countries by depicting the share (in %) of a country's total exports going to either the EU or the USA. The bubbles are proportional to the size of a country's exports. We have a preference for these type of 'bubble'diagrams. It visualizes the contribution of the most important countries by the size of the bubble. Representing each country as a one-dimensional 'dot' would make it impossible to distinguish the relative

importance of say, Luxembourg versus China. [11] The figure focuses on exports, but a similar picture holds for imports: the correlation between EU export and import percentages is 0.83 and between USA export and import percentages is 0.68. There is a large group of countries, including the EU countries themselves, which heavily depends (defined as: more than 50 percent) on the EU for its export flows, namely 53 countries (on the import side there are 43 countries). Non-participating country examples (not listed in the figure) are: Norway, Iceland, Albania, Tunisia, Bosnia & Hercegovina, and Cape Verde. Heavy dependence on the USA is much smaller (9 countries for exports and 3 for imports), in particular Canada and Mexico. A substantial number of countries close to the origin, including many large trading countries such as China, are not very dependent on the EU or the USA for their exports.

*Figure 5-1 Exports to EU and USA; % of country total exports, 2011*



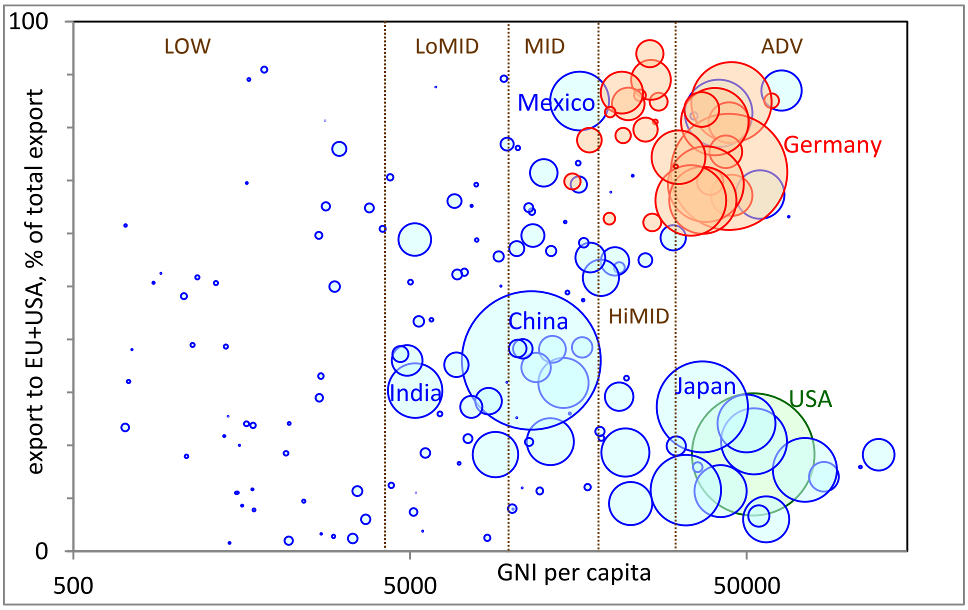

Source: calculations based on our trade data; bubbles proportional to size of total exports; EU countries in red circles with orange fill; 166 countries in total; the downward sloping diagonal indicates maximum range.

Figure 5-2 illustrates the relationship between the level of economic development, as measured by income per capita PPP using a log scale, and a country's total dependence on the TTIP countries for their exports (in percent: the sum of EU and USA export percentages). The graph clearly shows the high dependence of the EU countries on the TTIP countries for their exports, in line with Figure 5-1. The graph also illustrates the wide variation in the

[11] Fisher (2003) illustrates the importance of bubble diagrams when he analyzed trends in world income inequality; representing countries as 'dots' leads to the conclusion that rich countries become faster rich than poor countries; if countries are weighted by their population the opposite conclusion is reached (India, and China combined represent almost a third of world population and grow relatively faster than rich countries).

dependence of non-participating countries on the TTIP countries for their exports: the minimum is 1.6 percent, the maximum is 90.9 percent, the mean is 38.6 percent, and the standard deviation is 24.6 percent. Moreover, there is virtually no relationship between the level of economic development and this trade dependence: the correlation coefficient between the log of income per capita and the percent of exports going to the TTIP countries is a modest 0.05. Indeed, the figure shows that also for the poorest countries (the left part of the figure) there is enormous variation in export dependence. The 77 countries in the LOW and LoMID income groups include the minimum and maximum, while the mean and standard deviation is virtually the same as for the third country group as a whole.

*Figure 5-2 Economic development and EU+USA export dependence (% of total), 2011*




Source: calculations based on our trade data and World Development Indicators; GNI PPP in constant 2011 $; EU countries in red circles with orange fill; bubbles proportional to size of total exports; 166 countries in total.

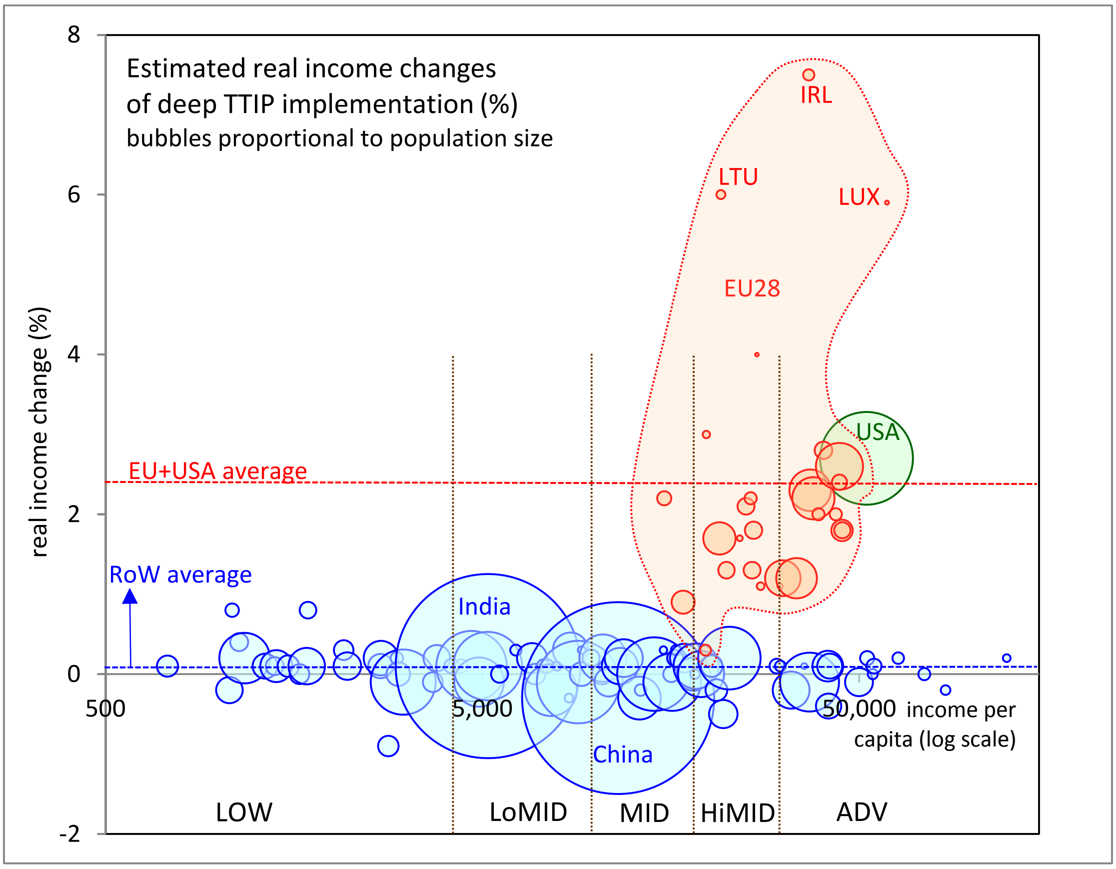
## 5.2 Standard Income Changes and TTIP

To get a feel for the importance of RTAs in general and for TTIP in particular, for non-participating third countries, specifically in relation to their development level, we use the information from a representative source for state-of-the-art CGE modeling, based on a standard RTA dummy variable (Felbermayr et al., 2014). We focus on the expected relative real income change (in percent) for each country in two scenarios.

First, the base scenario depicted in Figure 5-3 illustrates the connection, or absence thereof, between the level of economic development, measured using income per capita PPP (log scale), and the economic consequences of 'deep' TTIP (the negotiations are a success on all

levels), measured using the percentage change in real income, for the participating countries (USA and EU, the latter is grouped together under the label EU28 in the figure) and non-participating third countries (Rest of World, RoW). The size of the bubbles in the figure is proportional to a country's population level. The figure shows, in particular, that the economic consequences can be substantial for the participating countries where the trade-creation effect dominates: the simulated average change is 2.38 percent. Note that there is substantial variation for the EU countries, ranging from a low of 0.3 percent for Croatia to a high of 7.5 percent for Ireland. Also note that the EU countries are in three different income group classes (from MID to ADV).

*Figure 5-3 Income level and gains from deep TTIP implementation (%)*

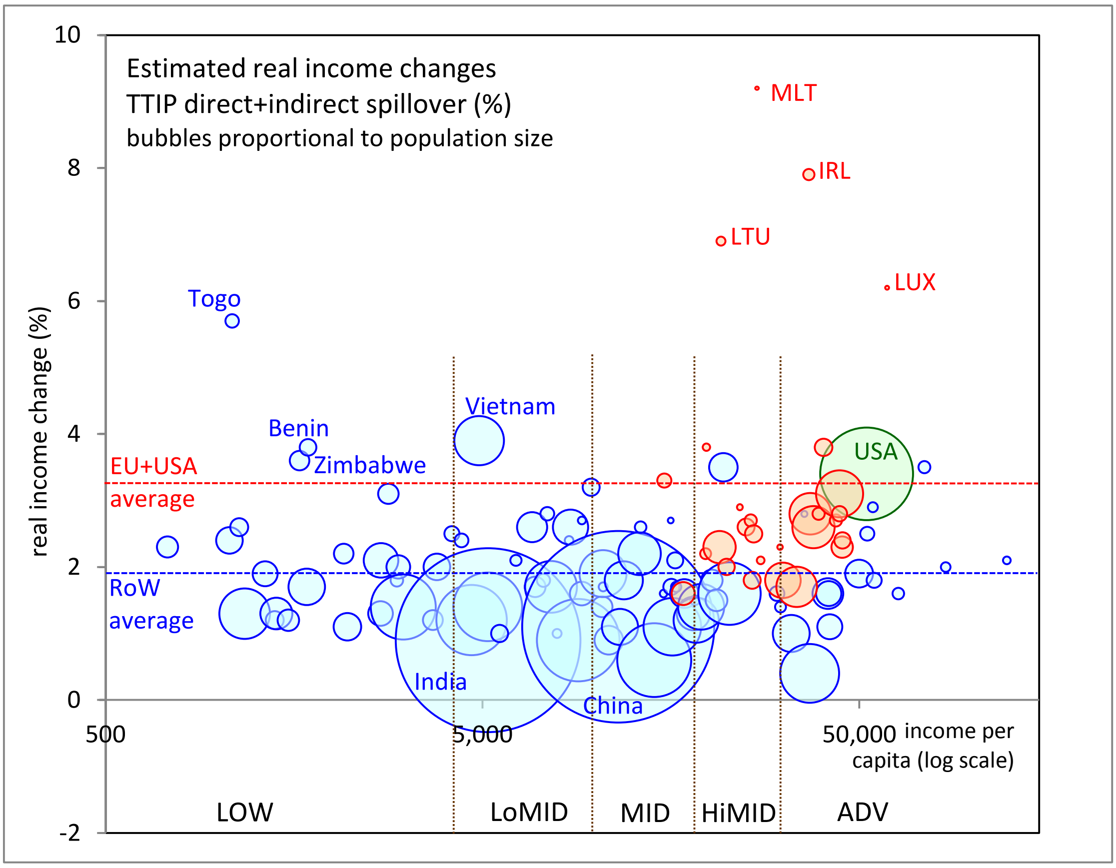



Source: based on data from Felbermayr et al. (2014) and World Development Indicators; EU countries in red circles with orange fill; 112 countries in total; vertical lines indicate income group boundaries.

For the non-participating countries the estimated economic consequences of deep TTIP are small as there is little trade creation and there may be some trade diversion (note that many third countries have a RTA with the EU or USA) . The average real income change is 0.06 percent and there is a modest negative relationship between a country's income level and the calculated income change: the correlation coefficient between the log of income per capita

and the relative income change is -0.21, indicating that poorer non-participating countries benefit a little more than richer non-participating countries. In view of the implied standard errors associated with these kind of exercises the income changes are basically zero for all third countries.

*Figure 5-4 Income level and gains from TTIP plus direct and indirect spillovers (%)*




Source: based on data from Felbermayr et al. (2014) and World Development Indicators; EU countries in red circles with orange fill; 112 countries in total; vertical lines indicate income group boundaries.

Second, the direct and indirect spillovers scenario is illustrated in Figure 5-4. It is a very optimistic scenario regarding the reduction in trade costs associated with TTIP based on the incentives created for private and government agents to invest in, for example, infrastructure, human capital, and cooperation. These investments are not directly related to TTIP, but by creating the incentives may be contributed to TTIP nonetheless, thus further lowering trade costs and hence the term direct and indirect spillovers. Figure 5-4 illustrates that the economic consequences of 'deep' TTIP can be more substantial under the very positive scenario of implied large direct and indirect spillovers. This benefits the participating countries themselves: the EU+USA average real income change rises from 2.38 to 3.26 percent (with the largest gain of 9.2 percent for Malta). In this case, however, the Rest of the World also

benefits: the RoW average real income change rises from 0.06 percent to 1.92 percent. Substantial gains, even higher than the average of the participating countries, are calculated for some LOW countries like Togo, Benin, and Zimbabwe and for LoMID country Vietnam.

So, in the most optimistic variant the income effects are positive for all countries.

### 5.3 TTIP Simulation

We can now start to calculate simulated consequences of TTIP for participating and non-participating countries. Key to our estimates is that TTIP will change relative 'prices' in the World Economy. Relative prices are relative to the so-called Multilateral Resistance (MR) terms (Box 5-1 provides the details of these terms). The intuition behind these terms is that TTIP changes relative prices in the World Economy. If prices between the EU and USA become lower because of TTIP, other countries become 'relatively' more expensive. This might be an incentive to divert trade in the direction of the EU-USA. Calculating how these terms change allow us to assess the current situation compared to a TTIP counterfactual. We can calculate the following expression that give us the effects on trade (following Egger and Larch, 2011). The percentage change in normalized trade due to TTIP, $\Delta T_{ij}$, can be expressed as:

$$\Delta\left[\frac{T_{ij}}{(Y_i E_j)}\right] = 100\,\frac{\left(P_j \Pi_i\right)^{\sigma-1}.t_{ij}{}^{1-\sigma} - \left[\left(P_j \Pi_i\right)^{\sigma-1}.t_{ij}{}^{1-\sigma}\right]^C}{\left[\left(P_j \Pi_i\right)^{\sigma-1}.t_{ij}{}^{1-\sigma}\right]^C}, \qquad (2)$$

where 'C' stands for 'counterfactual'

The counterfactuals consist of various combinations of TTIP that *might* become reality. Given the estimates of the contribution of each part of agreement heterogeneity we can now combine various provisions and calculate the contribution on different parts of the world (see Box 5-1, for the procedure).

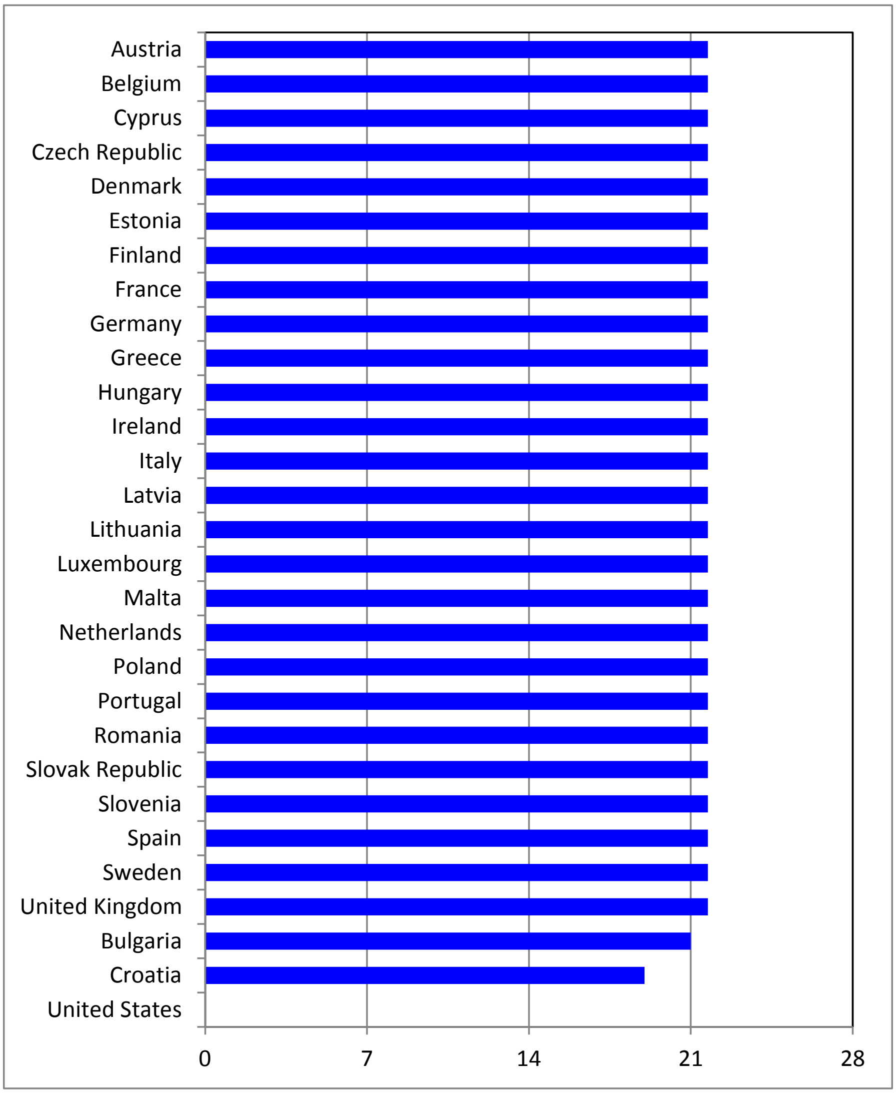
*Box 5-1 Empirical Application*

For the estimates we essentially follow Egger and Larch (2011), that is:

- Estimate (a variant) of equation (1) (various specifications are used)
- Use these estimates to calculate the multilateral resistance terms
- Introduce various potential elements of TTIP
- Calculate the counterfactuals
- Apply to equation (2)

As is standard in the gravity literature we can use the exporter and importer fixed effects as an approximation for the MR-terms, such that $\gamma_i F_i = Y_i(\Pi_i)^{\sigma-1}$, and $\delta_j F_j = Y_j(P_j)^{\sigma-1}$, Furthermore, as we estimate ln $(T_{ij})$, we calculate exp $(\beta_3 Z_{ijt} + \beta_4 RTA_{ijt} + \gamma_i F_i + \delta_j F_j + \zeta_t F_t + \varepsilon_{ijt})$, where $Z_{ij}$ stands for various traditional gravity variables, such as a common border, or common language. The counterfactuals are combinations of provisions that might apply once TTIP becomes operative.

*Figure 5-5 Average number of provisions per country (relative to other TTIP countries)*



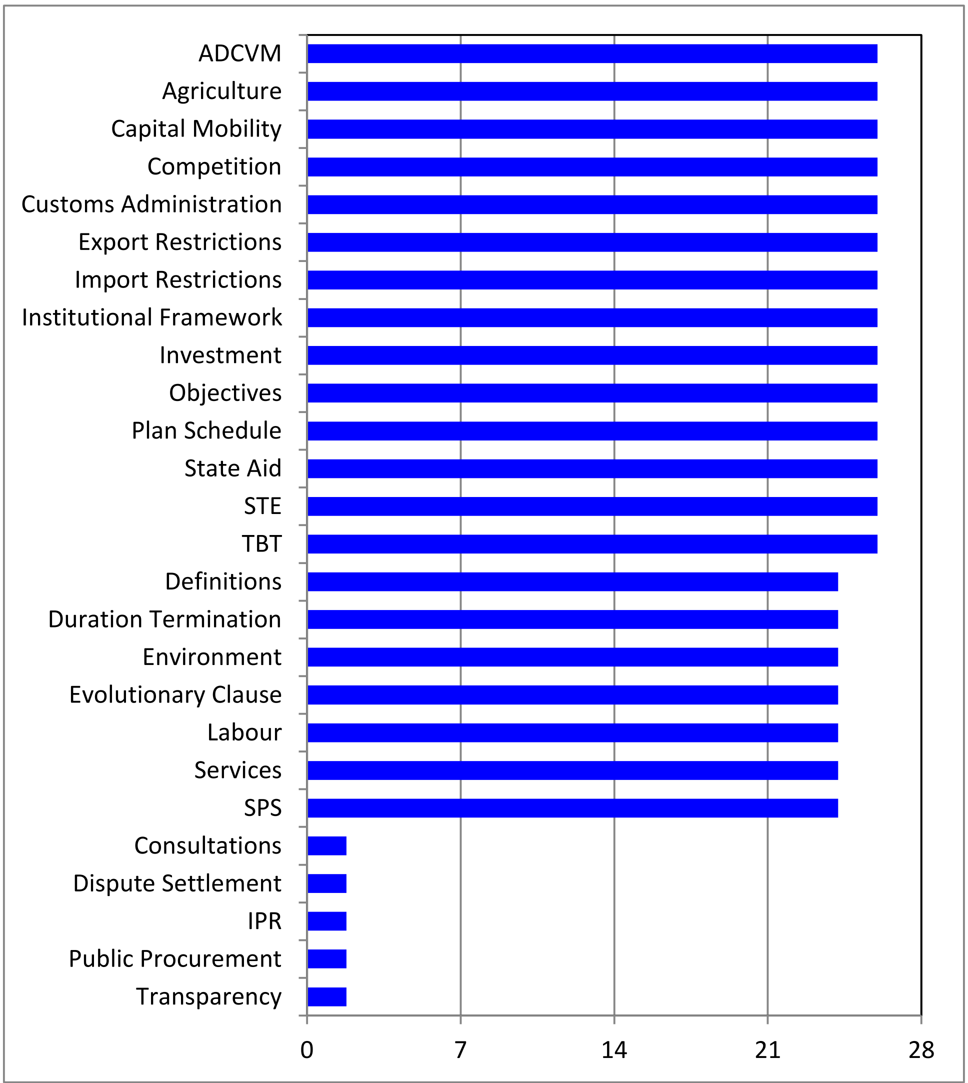

Source: calculations based on our trade data.

Before turning to the results it is useful to look at what we might expect and ask ourselves, what is the RTA scope of TTIP for the 26 provisions and 29 participating *countries*? For each of the provisions a dummy variable equals 1 if the provision is active and 0 if not. If we simply sum the provisions for an individual TTIP country the maximum score can be 28 (= 29-1). If TTIP is fully implemented (deep TTIP), then the counterfactual score will be equal

to this maximum. Figure 5-5 provides an indication of the extent to which the various TTIP countries may increase the number of active provisions by giving the number of active provisions relative to all other TTIP countries. In this perspective the country to gain most is the USA since its currently active average number of provisions is zero. In that sense we should not be surprised if the potential gains are relatively higher for the USA than for European countries. The figure also shows that from *this* perspective the potential gain is modest for the EU countries: it is the same for 26 of the 28 EU countries (which all have an average score of 21.7); the two exceptions are Bulgaria (with a score of 21) and Croatia (with a score of 19). Note, however, that for the EU as a *whole* the potential gain is similar to that of the USA, as there is no active RTA provision for any country relative to the US, while there is some room for additional gain within Europe.

We can also ask ourselves which *provisions* potentially might 'gain' the most. Using a similar procedure as for countries the maximum average score, which is achieved with deep TTIP implementation, is again 28. Figure 5-6 shows that for a number of provisions the potential 'gain' is relatively modest. There are 14 provisions (from ADCVM to TBT) that all have an average score of 26, so the potential extra gain from TTIP is only 2. Similarly, there are 7 provisions (from Definitions to SPS) that all have an average score of 24.2, so the potential extra gain from TTIP is also modest (namely 3.8). Finally, there are only 5 provisions (from Consultations to Transparency) that have a very low score of 1.8. For those provisions the potential gain from deep TTIP implementation is substantial.

*Figure 5-6 Average number of countries per provision (relative to TTIP countries)*




Source: calculations based on our trade data.

## 5.4 Estimation Results

We use the gravity equation to estimate the impact of RTAs on international trade flows. This is done in two stages.[12]

The first stage is to distinguish between countries that do trade and those that do not trade with one another. This so-called extensive margin analysis reveals to what extent trade agreements induce countries that did not trade before, to start trading with new partners once an RTA is enforced. The second stage then focusses on those countries that already have

[12] This estimation strategy explicitly deals with the zero observations in our data-set; modern estimates of the gravity model include zero trade flows in the estimations.

existing trade relationships, also known as the intensive margin of trade. From the intensive margin we can determine to what extent existing trade partners will trade more, or less, once an RTA is in place.

Following Egger and Larch (2011), we estimate the first stage with Probit model for cross-sections of the years 1990, 1995, 2000, 2005, 2010 and 2011[13] and specified as:

$$\Pr\left(M_{ijt} = 1 \middle| X_{ijt}\right) = \Phi\left(X'_{ijt}\beta\right), \quad (3)$$

where $M_{ijt}$ is a binary variable that is 1 if importer *i* has positive imports from exporter $j$ in year *t*. $X_{ijt}$ is a vector of regressors, with:

$$X_{ijt} = (\ln\left(Distance_{ij}\right), Border_{ij}, Language_{ij}, GSP_{ijt}, RTA_{ijt}, F_i, F_j)'. \quad (4)$$

The time-varying independent variable of interest is $RTA_{ijt}$, which is a binary variable that is 1 if there is an RTA between importer *i* and exporter *j* in year *t* and 0 otherwise. We also control for countries granting one another preferential market access under the Generalized System of Preferences (GSP) by including the variable $GSP_{ijt}$, which is 1 if GSP schemes apply and 0 otherwise. The other time-invariant independent variables are bilateral distance, and binary variables to capture whether countries in a country-pair have a geographic border or a language in common. $F_i$ and $F_j$ are fixed effects to control for unobserved importer or exporter-specific characteristics, respectively. Importantly, these terms represent the MR terms which will be used in the remainder of our analysis (see box 5-1). Our analyses take unilateral preferences under the Generalized System of Preference (GSP) into account. We find, in line with existing literature, that GSP schemes tend to have a small, positive effect on trade. However, just like RTAs, unilateral preferences are heterogeneous in nature (e.g. GSP, GSP+, Everything-But-Arms, etc.) Unfortunately, data coverage of all these different unilateral schemes is not yet sufficiently and reliably available to justify their inclusion in our analytical setup.

We proceed with three alternative strategies: (i) one RTA dummy, (ii) 26 indicators that capture specific provisions in RTAs, and (iii) factor analysis.

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[13] Panel techniques can be problematic for this combination of Probit and Poisson models due to a potential lack of convergence, caused by an incidental parameter problem (i.e. there are too many fixed effects), which is a well-known problem in the literature. A strategy to deal with this problem is to use cross-section estimates instead of panel estimates (see also Egger and Larch, 2011).

The first way is to simply include a binary ("dummy") trade agreement, *TA*, variable which registers when (R)TAs are active and inactive between trade partners. While this is a straightforward and the dominant approach in the literature, we have extensively argued above that this method fails to incorporate trade agreement heterogeneity.

We therefore introduce a second approach in order to account more appropriately for the fact that trade agreements are different by design and, therefore, in their effect on international trade. In this strategy, we replace the RTA dummy binary with 26 binary indicators, each representing a specific provision in the RTA.

Our third and final strategy is to use factor analysis to deal with clusters of provisions. We postpone the discussion of this method to section 5.6.

Table 5-1 shows the estimation results for the first stage (extensive margin) with (i) one RTA dummy and (ii) 26 provisions. The former is presented in column 1, the latter in column 2-7. The positive and significant RTA coefficient in column 1 shows that RTAs induce non-trading countries to commence trading with new partners (this effect is based on an analysis for 2011. Analyses of other years gives the same outcome). Nevertheless, it is not straightforward what type of trade-related policies are actually responsible for this trade-creating effect. In column 2, we show the effects of 26 trade-related provisions for 1990 (column 2), 1995 (column 3), 2000 (column 4), 2005 (column 5), 2010 (column 6) and 2011 (column 7). Surprisingly, the individual effects are widely different across these years. For example, in 2011 (column 7) we *only* find positive and significant effects for Import Restrictions, State Aid, and Definitions on the intensive margin of trade. Negative and significant effects are obtained for Labor. All other provisions do not have a clearly positive or negative effect. This also is true for SPS and TBT, of which the effects are not statistically different from zero (but correlation between provisions could explain this to some extent, see section 5.6). Yet, compared to other years, the conclusions we draw from 2011 for specific provisions do not necessarily hold.

*Table 5-1: Probit Estimation Results (Extensive Margin)*

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|---|
| ln(Distance) | -0.759*** | -0.758*** | -0.718*** | -0.720*** | -0.685*** | -0.708*** | -0.677*** |
| | (0.0260) | (0.0284) | (0.0243) | (0.0236) | (0.0271) | (0.0277) | (0.0277) |
| Common border | -0.140 | 0.310* | -0.0195 | -0.103 | -0.0900 | -0.398* | -0.239 |
| | (0.175) | (0.142) | (0.143) | (0.156) | (0.185) | (0.187) | (0.192) |
| Common language | 0.533*** | 0.546*** | 0.607*** | 0.412*** | 0.515*** | 0.489*** | 0.491*** |
| | (0.0391) | (0.0406) | (0.0379) | (0.0375) | (0.0399) | (0.0403) | (0.0405) |
| GSP | 0.272** | 0.401*** | 0.0951 | 0.255* | 0.121 | 0.318** | 0.382*** |
| | (0.0914) | (0.111) | (0.0811) | (0.102) | (0.0831) | (0.115) | (0.108) |
| TA | 0.315*** | | | | | | |
| | (0.0494) | | | | | | |
| AD & CVM | | 4.092** | -6.990*** | -1.599*** | -1.144*** | -0.911*** | -0.587 |
| | | (1.261) | (0.976) | (0.288) | (0.281) | (0.256) | (0.307) |
| Agriculture | | 0.188 | -4.763*** | -0.321 | -0.518* | -0.538* | -0.407 |
| | | (2.799) | (0.931) | (0.502) | (0.242) | (0.221) | (0.219) |
| Customs Administration | | -0.434 | 1.501** | 0.0914 | 0.0289 | 0.305 | 0.122 |
| | | (0.386) | (0.571) | (0.300) | (0.260) | (0.214) | (0.226) |
| Export Restrictions | | 0.884 | 0.573 | 1.158** | 0.374 | 0.0433 | 0.0333 |
| | | (0.973) | (0.523) | (0.386) | (0.239) | (0.196) | (0.193) |
| IPR | | -10.63*** | -0.347 | -0.796* | -0.486 | -0.0895 | -0.347 |
| | | (2.855) | (0.749) | (0.322) | (0.309) | (0.295) | (0.276) |
| Import Restrictions | | -4.474*** | 4.040** | -0.00753 | 0.767* | 0.800* | 0.779** |
| | | (0.843) | (1.505) | (0.350) | (0.354) | (0.324) | (0.289) |
| Investment | | 5.616*** | 0.131 | 0.0851 | 0.0360 | 0.0829 | -0.288 |
| | | (1.405) | (0.958) | (0.268) | (0.215) | (0.244) | (0.229) |
| Public Procurement | | . | . | -0.230 | 0.142 | -0.121 | -0.0496 |
| | | (.) | (.) | (0.365) | (0.273) | (0.254) | (0.259) |
| SPS | | 1.323** | 0.393 | 0.327 | 0.416 | -0.129 | -0.291 |
| | | (0.497) | (0.730) | (0.300) | (0.278) | (0.195) | (0.231) |
| STE | | . | 1.987* | -0.402 | -0.373 | -0.361 | -0.325 |
| | | (.) | (0.902) | (0.478) | (0.368) | (0.251) | (0.281) |
| Services | | 3.306 | -2.115** | -0.0520 | -0.613* | -0.0966 | 0.315 |
| | | (1.858) | (0.817) | (0.251) | (0.295) | (0.261) | (0.255) |
| State Aid | | -8.654** | 2.688*** | 1.179** | 1.193*** | 1.210*** | 1.065*** |
| | | (3.265) | (0.692) | (0.391) | (0.219) | (0.234) | (0.242) |
| TBT | | -1.981*** | -1.611* | -0.343 | -0.143 | -0.0397 | 0.430* |
| | | (0.578) | (0.676) | (0.246) | (0.204) | (0.222) | (0.209) |
| Capital Mobility | | -1.604* | -0.614 | -0.732* | 0.525* | 0.139 | 0.116 |
| | | (0.720) | (0.399) | (0.357) | (0.210) | (0.211) | (0.206) |
| Competition | | 4.998*** | 4.715*** | 0.00787 | 0.336 | 0.189 | 0.146 |
| | | (1.075) | (0.572) | (0.293) | (0.212) | (0.230) | (0.223) |
| Environment | | . | 1.532 | -0.0193 | -0.579 | -0.480 | -0.400 |
| | | (.) | (1.796) | (0.237) | (0.298) | (0.284) | (0.288) |
| Labour | | 4.255* | -7.066*** | -0.244 | -0.163 | -0.544 | -0.690* |
| | | (1.729) | (0.924) | (0.427) | (0.401) | (0.316) | (0.311) |
| Consultations | | 5.841*** | 1.075* | 0.408 | -0.386 | -0.440 | -0.415 |
| | | (0.786) | (0.501) | (0.271) | (0.199) | (0.226) | (0.255) |
| Definitions | | -4.320*** | -4.561*** | 0.0275 | -0.262 | 0.460* | 0.540* |
| | | (1.213) | (1.128) | (0.407) | (0.217) | (0.234) | (0.211) |
| Dispute Settlement | | . | 3.018* | 0.326 | 0.510* | -0.0691 | -0.118 |
| | | (.) | (1.323) | (0.299) | (0.227) | (0.236) | (0.248) |
| Duration & Termination | | . | 0.791 | 0.0643 | -0.552* | -0.310 | 0.0921 |
| | | (.) | (0.435) | (0.388) | (0.224) | (0.277) | (0.253) |
| (continued on next page) | | | | | | | |

| (continued from previous page) | | | | | | | |
|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| Evolutionary Clause | | 2.814*** | -3.611*** | -0.0711 | 0.554* | 0.255 | -0.353 |
| | | (0.382) | (0.574) | (0.284) | (0.236) | (0.271) | (0.233) |
| Institutional Framework | | -2.538*** | 3.660*** | 0.850* | 0.352 | 0.112 | 0.198 |
| | | (0.523) | (1.070) | (0.360) | (0.257) | (0.282) | (0.256) |
| Objectives | | . | 0.718 | 0.535 | 0.0640 | 0.00800 | -0.0117 |
| | | (.) | (1.445) | (0.331) | (0.300) | (0.281) | (0.256) |
| Plan & Schedule | | . | 5.744*** | -0.00793 | 0.294 | 0.184 | 0.192 |
| | | (.) | (0.630) | (0.231) | (0.203) | (0.162) | (0.151) |
| Transparency | | 0.347 | 1.794 | -0.149 | -0.230 | 0.261 | 0.0363 |
| | | (0.312) | (2.285) | (0.249) | (0.261) | (0.200) | (0.226) |
| Constant | 10.73*** | 11.41*** | 12.59*** | 13.28*** | 10.05*** | 10.30*** | 9.970*** |
| | (0.490) | (0.479) | (0.682) | (0.634) | (0.465) | (0.521) | (0.501) |
| Year | 2011 | 1990 | 1995 | 2000 | 2005 | 2010 | 2011 |
| Pseudo $R^2$ | 0.532 | 0.583 | 0.559 | 0.532 | 0.538 | 0.539 | 0.537 |
| N | 28,897 | 22,951 | 30,393 | 30,452 | 29,410 | 29,568 | 28,897 |

Robust standard errors in parentheses. $^{*}$ $p < 0.05$, $^{**}$ $p < 0.01$, $^{***}$ $p < 0.001$. Estimates obtained using Probit. Dependent variable is a binary variable that is 1 if nominal imports are positive and 0 otherwise. Parameter estimates of importer and exporter fixed effects are omitted for brevity.

The second stage (intensive margin) is estimated with a Poisson model for the same cross-sections mentioned above. We choose Poisson as opposed to ordinary least squares (OLS) regression because Poisson is by now a preferred method for gravity analyses to explicitly account for the fact that not all countries trade with one another (see Head and Mayer, 2015, for a discussion). We obtain our parameter estimates according to the following specification:

$$IM_{ijt} = \alpha \quad + \beta_1 \ln\left(Distance_{ij}\right) + \beta_2 Border_{ij} + \beta_3 Language_{ij} + \beta_4 GSP_{ijt} + \beta_5 RTA_{ijt} + F_i + F_j + \varepsilon_{ijt}. \quad (5)$$

where $IM_{ijt}$ is country $i$'s nominal imports in US$ from country $j$ in year $t$, $\alpha$ is a constant and $\varepsilon_{ijt}$ the error term. The other independent variables and fixed effects are as described in the first stage (equation 4).

Table 5-2 shows the estimation results for the second stage (intensive margin) with (i) one RTA dummy in column 1, and (ii) 26 individual provisions in columns 2-7. The positive and significant RTA coefficient in column 1 shows that RTAs cause existing trade partners to further increase their bilateral trade (this effect is based on an analysis for 2011. Analyses of other years gives the same outcome).

*Table 5-2: Poisson Estimation Results (Intensive Margin)*

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|---|
| ln(Distance) | -0.654*** | 0.416* | -0.535*** | -0.506*** | -0.592*** | -0.587*** | -0.590*** |
| | (0.0376) | (0.199) | (0.0363) | (0.0357) | (0.0364) | (0.0395) | (0.0394) |
| Common border | 0.399*** | 1.894*** | 0.498*** | 0.519*** | 0.330*** | 0.405*** | 0.432*** |
| | (0.0942) | (0.345) | (0.108) | (0.0949) | (0.0767) | (0.0794) | (0.0798) |
| Common language | 0.105 | 0.895** | 0.384*** | 0.268*** | 0.238** | 0.241** | 0.212** |
| | (0.0813) | (0.292) | (0.0754) | (0.0705) | (0.0767) | (0.0785) | (0.0798) |
| GSP | -0.0998 | 0.794 | 0.102* | 0.0360 | 0.0112 | -0.0146 | -0.0271 |
| | (0.0518) | (0.418) | (0.0515) | (0.0476) | (0.0548) | (0.0534) | (0.0527) |
| RTA | 0.273*** | | | | | | |
| | (0.0693) | | | | | | |
| AD & CVM | | . | 0.178 | 0.0694 | 0.0818 | 0.0259 | -0.0301 |
| | | (.) | (0.284) | (0.222) | (0.145) | (0.121) | (0.118) |
| Agriculture | | . | -0.751 | -0.565* | -0.522*** | -0.377** | -0.426*** |
| | | (.) | (0.390) | (0.252) | (0.137) | (0.129) | (0.127) |
| Customs Administration | | . | -0.385 | -0.383* | -0.294 | -0.0772 | -0.0339 |
| | | (.) | (0.218) | (0.163) | (0.157) | (0.141) | (0.132) |
| Export Restrictions | | . | -0.0581 | 0.168 | 0.0780 | 0.511*** | 0.502*** |
| | | (.) | (0.287) | (0.162) | (0.131) | (0.124) | (0.123) |
| IPR | | . | 0.0399 | 0.273 | 0.459* | 0.448** | 0.377* |
| | | (.) | (0.250) | (0.189) | (0.182) | (0.155) | (0.148) |
| Import Restrictions | | . | -0.308 | -1.584*** | -0.305 | -0.999** | -0.953** |
| | | (.) | (0.448) | (0.284) | (0.382) | (0.339) | (0.332) |
| Investment | | . | -0.754** | -0.389* | 0.424** | -0.0465 | 0.0195 |
| | | (.) | (0.251) | (0.152) | (0.159) | (0.129) | (0.121) |
| Public Procurement | | . | 0.180 | -0.229 | -0.118 | -0.101 | 0.0123 |
| | | (.) | (0.172) | (0.122) | (0.143) | (0.143) | (0.135) |
| SPS | | . | -0.158 | -0.743*** | -0.422** | -0.216 | -0.201 |
| | | (.) | (0.163) | (0.110) | (0.131) | (0.113) | (0.110) |
| STE | | . | -0.295 | -0.429** | -0.389** | -0.434*** | -0.392** |
| | | (.) | (0.177) | (0.140) | (0.143) | (0.125) | (0.125) |
| Services | | . | 0.804*** | 0.369* | -0.625*** | -0.398** | -0.385** |
| | | (.) | (0.240) | (0.183) | (0.179) | (0.134) | (0.132) |
| State Aid | | . | 1.894*** | 1.028*** | 0.625*** | 0.480*** | 0.462*** |
| | | (.) | (0.355) | (0.162) | (0.155) | (0.142) | (0.134) |
| TBT | | . | -0.386* | 0.359* | -0.412** | -0.0559 | -0.108 |
| | | (.) | (0.191) | (0.156) | (0.139) | (0.135) | (0.119) |
| Capital Mobility | | . | -0.150 | -0.0184 | 0.0708 | -0.0354 | -0.0681 |
| | | (.) | (0.224) | (0.153) | (0.112) | (0.122) | (0.117) |
| Competition | | . | 0.840** | 0.0135 | 0.359* | -0.0509 | -0.0130 |
| | | (.) | (0.259) | (0.240) | (0.158) | (0.133) | (0.126) |
| Environment | | . | 0.483** | 0.431** | 0.0892 | 0.0801 | 0.0380 |
| | | (.) | (0.186) | (0.160) | (0.155) | (0.153) | (0.146) |
| Labour | | . | -1.170** | -0.0706 | 0.0555 | 0.322* | 0.420** |
| | | (.) | (0.384) | (0.173) | (0.177) | (0.151) | (0.148) |
| Consultations | | . | 0.501* | 0.209 | -0.719*** | -0.634*** | -0.633*** |
| | | (.) | (0.196) | (0.127) | (0.164) | (0.164) | (0.156) |
| Definitions | | . | 1.142*** | -0.0367 | 0.189 | -0.00121 | -0.0387 |
| | | (.) | (0.250) | (0.135) | (0.147) | (0.148) | (0.145) |
| Dispute Settlement | | . | -1.000*** | -0.158 | 0.377 | -0.128 | -0.122 |
| | | (.) | (0.189) | (0.169) | (0.202) | (0.134) | (0.122) |
| Duration & Termination | | . | 0.0772 | 0.128 | -0.0479 | 0.0196 | -0.0728 |
| | | (.) | (0.183) | (0.130) | (0.135) | (0.114) | (0.105) |
| (continued on next page) | | | | | | | |

| (continued from previous page) | | | | | | | |
|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| Evolutionary Clause | | . | 0.0664 | -0.0201 | 0.321* | 0.110 | 0.160 |
| | | (.) | (0.144) | (0.125) | (0.136) | (0.133) | (0.130) |
| Institutional Framework | | . | -0.482* | 1.136*** | 0.830*** | 1.364*** | 1.448*** |
| | | (.) | (0.214) | (0.290) | (0.238) | (0.264) | (0.256) |
| Objectives | | . | 1.108*** | 1.534*** | 0.395 | 0.643** | 0.514* |
| | | (.) | (0.279) | (0.263) | (0.284) | (0.248) | (0.221) |
| Plan & Schedule | | . | -0.965*** | -0.155 | 0.285 | 0.0286 | 0.0349 |
| | | (.) | (0.150) | (0.120) | (0.175) | (0.139) | (0.134) |
| Transparency | | . | 0.265 | -0.144 | -0.286* | -0.0512 | -0.0785 |
| | | (.) | (0.224) | (0.128) | (0.141) | (0.119) | (0.118) |
| Year | 2011 | 1990 | 1995 | 2000 | 2005 | 2010 | 2011 |
| N | 28,449 | 19,360 | 24,999 | 28,449 | 28,449 | 28,449 | 28,449 |

Robust standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Estimates obtained using Poisson (poi2hdfe in STATA). Dependent variable is nominal imports. Parameter estimates of importer and exporter fixed effects are omitted for brevity. Estimates for 1990 are skipped because there was no convergence.

In column 2-7, we show the individual effects of 26 trade-related provisions for different cross sections. These effects related to trade at the intensive margin, i.e. provisions are expected to affect trade flows between current trade partners differently. Note that just as with the extensive margin, the parameter estimates are unstable over time. The coefficients change in terms of their sign and significant across columns 2-7 (different years). The only provisions that seem to be relatively stable over time and that have a positive, trade-promoting effect that stimulates trade in the intensive margin, are IPR, State Aid, Institutional Framework and Objectives. In contrast, Agriculture, Import Restrictions, STE and Consultations seem to have a negative effect on trade at the intensive margin.

Overall, the parameter estimates are somewhat unstable over time. This is also the case for SPS and TBT provisions. As indicated in chapter 4, provisions could be active in groups; if you find provision *A* to be active in a particular country, you often also find provisions *B* or *C*; occurrence of provisions can be correlated. This possibility is dealt with in section 5.6.

In general, we find that RTAs stimulate trade both at the extensive and the intensive margin of trade. These estimates can now be used to calculate the associated counterfactual trade effects for third, and low income countries.

## 5.5 Low Income Countries and the Trade Effects of TTIP

To estimate the counterfactual trade effects for different countries in the world we have to estimate the substitution effects as well as the impact on trade of income changes (trade diversion and trade creation). The relevant information regarding the estimates is presented in section 5.4. The relevant information regarding the income effects is discussed in section 5.2.

The most direct trade impact is, of course, for the TTIP countries themselves. They see their bilateral trade costs directly affected from changes in the RTA agreements, either by using the RTA dummy approach, or by focusing on specific provision dummy variables, or (to avoid multi-collinearity problems) by using RTA factors (section 5.6). The non-participating RoW countries do not see their direct trade costs affected. They are, however, exposed to substitution effects associated with TTIP, as measured using the multilateral resistance terms, and trade effects associated with income changes in the various participating countries (see box 5-1).

Trade effects can be created, in principle, through both the extensive as well as the intensive margin. Our extensive margin effects are discussed in the Probit analysis of section 5.4. In this particular case, however, all imports in all TTIP countries from all other TTIP countries are already positive.[14] There can thus be no positive effects on the extensive margin for the TTIP countries. For the RoW countries there can be no changes in the extensive margin based on any changes in the direct trade costs. Any such changes can thus only arise from indirect, second order effects related to income changes. These changes cannot have a substantial impact on global trade flows, so we abstract from possible changes in the extensive margin for RoW countries. Regarding the intensive margin, we calculate all changes in trade flows associated with the direct impact of changes in trade costs, as measured using our parameter estimates, and of indirect changes in the multilateral resistance terms, as measured using the importer and exporter fixed effect dummies. Many studies have estimated the income effects associated with TTIP for the participating countries and for the rest of the world. We take the Felbermayr et al. (2014) results for deep TTIP discussed in section 5.2 and illustrated in Figure 5-3 as representative for these income effects and use these for our own calculations.[15]

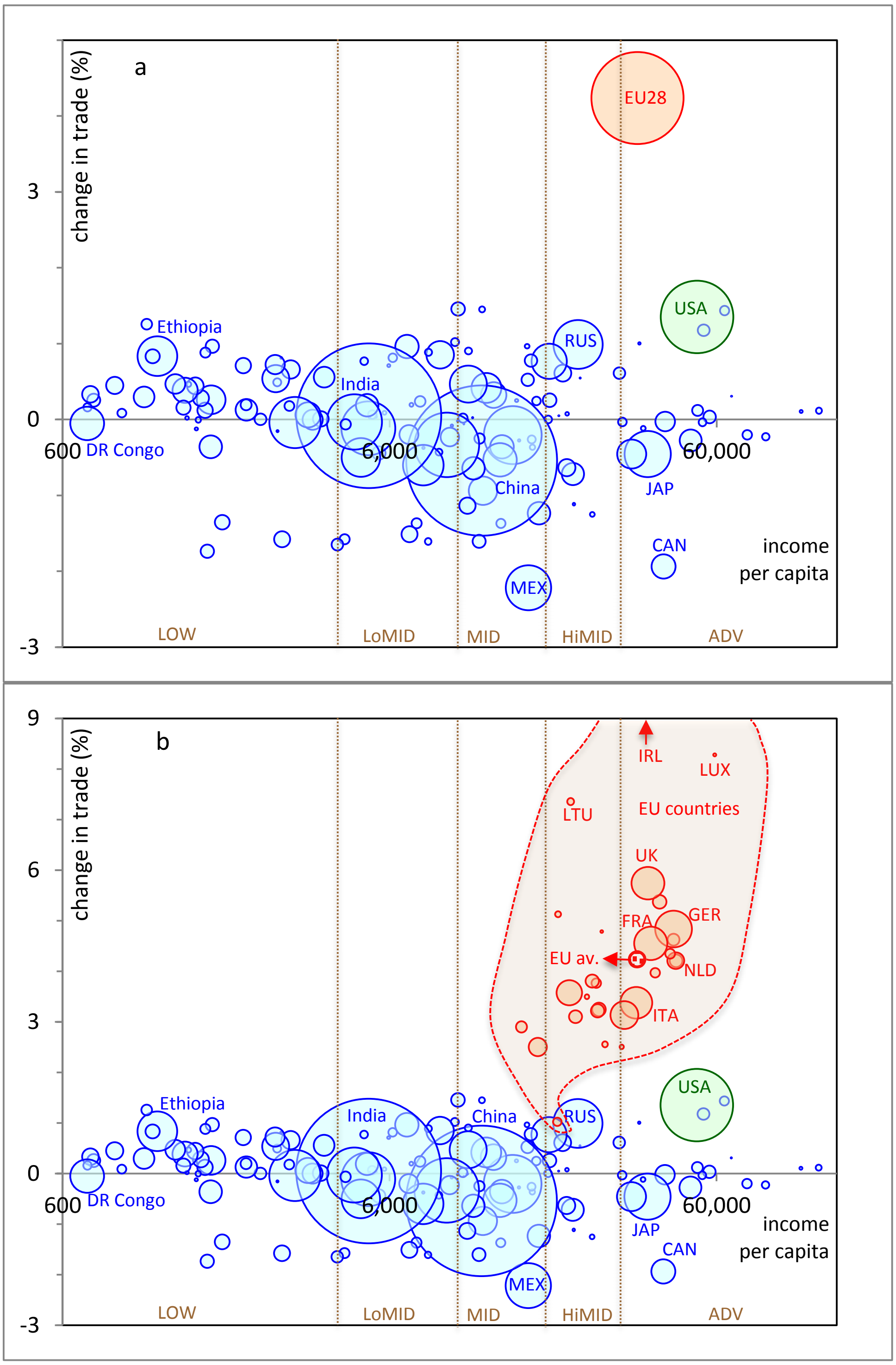
Figure 5-7 starts with providing an overview of the effects of TTIP on trade flows, measured as percentage relative changes (average of a country's export and import effects) for all countries in the world.

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[14] Data for 2011.

[15] The income effects for individual RoW countries missing in the Felbermayr et al. (2014) data are set to zero. The trade flows of these countries will nonetheless be affected through the multilateral resistance terms and the income effects of all of their trading partners.

*Figure 5-7 TTIP trade effects; RTA dummy approach, relative change in percent*




Source: calculations based on our trade data and World Development Indicators; GNI PPP in constant 2011 $, log scale; EU countries in red circles with orange fill; bubbles proportional to size of populaton; 166 countries in total; EU av. = population weighted EU average: GNI PPP = 34,331 and change in trade = 4.2 percent.

The top panel shows the average, population-weighted impact for the EU28 countries, namely a 4.2 percent trade increase located at an income level of $ 34,331 with a total population of 507 million. The bottom panel shows the EU countries separately (as well as indicating where the EU28 average is located). There is considerable variation within the EU, from a low of 1.0

percent for Croatia to a high of 13.1 percent for Ireland.[16] We see again that the effects are most pronounced for the TTIP countries themselves. This time the EU is on average doing better than the USA, mostly because of the diminishing flows relative to Canada and Mexico. EU countries and countries close to the EU feel trade creation/income growth effects of TTIP. The overall effect relative to the non-participating RoW countries is modest, but with significant variation, as discussed below. The overall suggestion is that the lower income RoW countries are relatively better off than the higher income RoW countries.[17] Many African countries have close ties with the EU and trade and income growth of EU stimulates their trade (competition effects are modest). Countries close to the USA (Honduras, Haiti) experience more competition, and see trade decline. Box 5-2 discusses examples to *illustrate* why differences between countries exist.

*Box 5-2 Some African examples of trade effects*

As discussed in the main text, the total reported trade effects are the result of the substitution effects and the income effects of both imports and exports relative to *all* trading partners of a particular country. To illustrate how the combination of these effects work we discuss two African examples. The first example relates to Chad (which does poorly) and the second example to Togo (which does well), see Figure 5-8.

*Table 5-4 Some African examples*

| | Chad | C African R | Ghana | Togo |
|---|---|---|---|---|
| *a. General information* | | | | |
| Income class | LOW | LOW | LOW | LOW |
| GNI PPP per capita | 1,847 | 911 | 3,785 | 1,084 |
| Population (million) | 12.8 | 4.6 | 25.9 | 6.8 |

[16] The effect for Ireland is so large we did not include it in the figure in panel b.

[17] A formal regression of the relative change in trade flows on the log of GNI per capita is negative, but not statistically significant. See the discussion in the main text.

| *b. Trade information* | | | | |
|---|---|---|---|---|
| Import (billion) | 0.63 | 0.72 | 16.05 | 3.61 |
| Export (billion) | 3.77 | 0.06 | 8.20 | 1.05 |
| Import USA (%) | 5 | 2 | 8 | 5 |
| Import EU (%) | 48 | 24 | 24 | 32 |
| Export USA (%) | 83 | 4 | 9 | 0 |
| Export EU (%) | 8 | 49 | 56 | 18 |
| *c. TTIP trade effects (%)* | | | | |
| Substitution import | 0.0 | 0.0 | -0.5 | -0.4 |
| Substitution export | -5.7 | 0.0 | -0.7 | 0.0 |
| Income import | 0.5 | 0.3 | 0.9 | 1.6 |
| Income export | 2.4 | -0.1 | 1.5 | 1.3 |
| Total import | 0.5 | 0.3 | 0.3 | 1.2 |
| Total export | -3.2 | -0.1 | 0.8 | 1.3 |
| Total trade effect | -1.35 | 0.09 | 0.56 | 1.26 |

Source: calculations based on our trade data and World Development Indicators.

Chad is a land-locked country and Togo is a coastal country. For comparison purposes we therefore chose a neighboring land-locked country for Chad, namely Central African Republic (CAR for short), and a neighboring coastal country for Togo, namely Ghana. The main exports are: oil and textiles for Chad; oil and minerals for Ghana; reexports and cotton for Togo; and diamonds and timber for CAR.[18] Table 5-4 provides more detailed information about these four countries and the various TTIP trade effects. The bottom row in the table reports the ultimate total TTIP trade effect as illustrated in Figures 5-7 and 5-8. The columns are ordered from low to high in total trade effect.

All four countries are LOW income countries; CAR is poorest ($ 911) and Ghana is richest ($ 3,785). Total population varies from 4.6 million for CAR to 25.9 million for Ghana. With the exception of Chad, all countries import more than they export. All trade flows are small: if we sum all imports and all exports for all four countries the total is $ 35 billion. For comparison:

[18] CIA World Factbook.

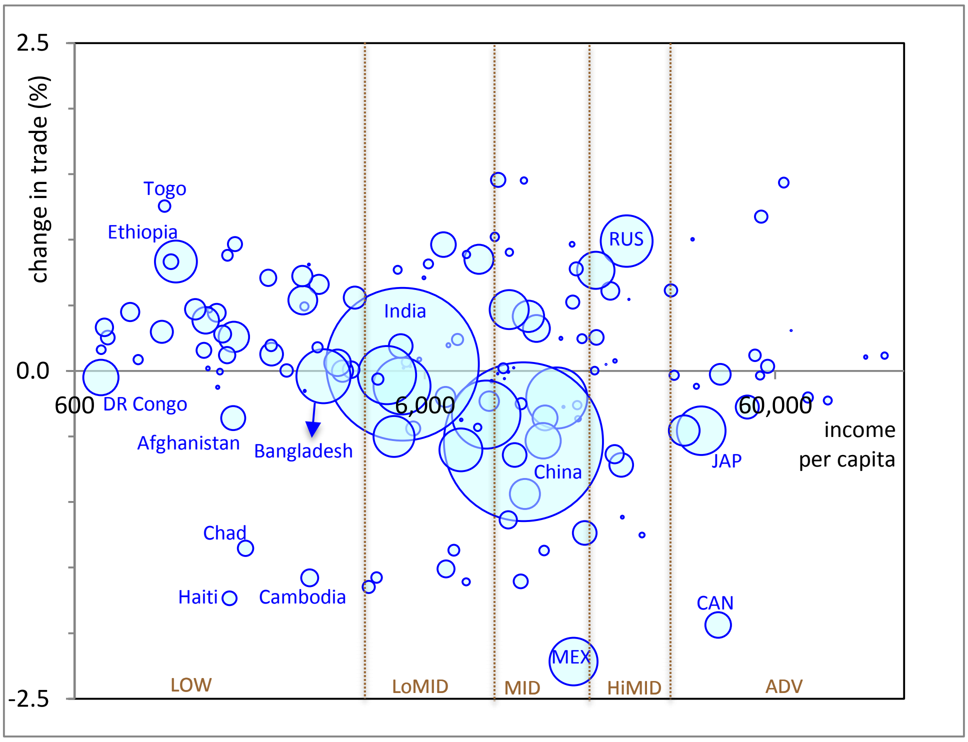
Dutch trade flows are 35 times as large (imports 27 times as large and exports 47 times as large), while Dutch population is only 1/3rd of the total population of these four countries. All countries import very little from the USA (ranging from 2 to 8 percent) and more substantially from the EU (ranging from 24 to 48 percent). CAR and Ghana export very little to the USA (4 and 9 percent) and Togo nothing at all. In contrast, most of Chad's exports are directed towards the USA. CAR and Ghana export a lot to the EU (49 and 56 percent), while Chad and Togo export relatively little (8 and 18 percent).

When we look at the simulated TTIP trade effects we see that the substitution effect is basically zero for Chad and CAR imports and for CAR and Togo exports; the exposure to TTIP competition is limited for these trade flows in view of the limited exposure to EU and USA trade. The substitution effect is mildly negative for Ghana imports and exports (-0.5 and -0.7) and for Togo imports (-0.4). The substitution effect is very negative (-5.7) for Chad exports since almost all of its exports are directed towards the USA, where the competition effect is the strongest. All income effects are positive, with the exception of the small decrease (-0.1) for CAR. The largest effect is +2.4 percent for Chad's exports, but this can only partially compensate for the negative substitution effect. The total effect for imports and exports is the sum of the substitution and income effects; it is positive for imports for all four countries, but particularly negative for exports for Chad for the reasons explained above. The total trade effect is the result of both import and export changes. When we look at the decomposition of the elements we understand how these differences come about. Note, that we can continue this analysis at an even deeper level if we look at the composition of trade flows for the African countries relative to the EU countries; Figure 5-7 illustrates in panels a and b that there are large differences between the EU countries and the total income and substitution effects are relative to all these countries.

Figure 5-8 provides a blown-up version of the TTIP trade effects for the RoW countries. The variation for all income groups is substantial, and indeed as Table 5-1 shows the standard deviation is similar for all income groups. Some big countries in the ADV group, such as Canada and Japan, are faced with negative trade effects, hence the negative effect for the income group as a whole. In contrast, some big countries in the HiMID income group, such as Russia and Turkey (not shown in the figure, but right next to Russia), are faced with positive trade effects, hence the positive effect for the group as a whole. Many countries in the MID income group, particularly the bigger countries such as China, Brazil, and Mexico, are

confronted with negative trade effects, hence the overall negative picture. The average for the LoMID group is basically neutral, because the (small) negative effects for Indonesia and the Philippines are compensated with the (modest) positive effect for giant India. The LOW income group, finally, is generally confronted with positive trade effects, particularly for most African countries, such as Togo and Ethiopia (with Chad as an exception). The effects are still negative, however, for some poor Asian (Cambodia) and American (Haiti) countries.

*Figure 5-8 TTIP trade effects for RoW; RTA dummy approach, relative change in percent*




Source: calculations based on our trade data and World Development Indicators; GNI PPP in constant 2011 $; bubbles proportional to size of populaton; 137 countries in total.

Table 5-3 provides summary statistical information on the TTIP trade effects for the TTIP countries themselves and the RoW countries, where the latter is subdivided into the five income classes. The effect is clearly positive for the TTIP countries, with an average increase of 4.3 percent, a median of 3.8 percent, and a standard deviation of 2.3 percent. The effect for the TTIP countries is somewhat smaller if we use a population-weighted average, namely 3.1 percent instead of 4.3 percent. There are 29 TTIP countries with a total population of 823 million people. The average impact of TTIP for the trade flows of the 137 RoW countries with a total population of 6 billion people is *zero*. The median is slightly positive, but the population-weighted average is -0.2 percent. All in all, therefore, the trade effects are negligible or small for the RoW countries.

*Table 5-3 TTIP trade effects; RTA dummy variable approach, relative change in percent per group or income class*[19]

| Group | Mean | | Median | Stand. dev. | Number countries | Population milion |
|---|---|---|---|---|---|---|
| | normal | pop wgh | | | | |
| TTIP countries | 4.28 | 3.13 | 3.81 | 2.28 | 29 | 823 |
| RoW countries | 0.01 | -0.17 | 0.05 | 0.73 | 137 | 5,994 |
| ADV | 0.03 | -0.45 | -0.03 | 0.72 | 18 | 316 |
| HiMID | 0.01 | 0.59 | 0.08 | 0.73 | 13 | 308 |
| MID | -0.19 | -0.54 | -0.21 | 0.82 | 29 | 2,143 |
| LoMID | -0.03 | -0.05 | -0.02 | 0.75 | 33 | 2,288 |
| LOW | 0.16 | 0.20 | 0.22 | 0.65 | 44 | 939 |

Source: authors's calculations based on all information; pop wgh = population weighted average; Stand. dev. = standard deviation; see Table 2-1, for income classes; regular RTA dummy approach

This does not hold for the different income classes that we have defined. The unweighted average is basically zero for the ADV, HiMID, and LoMID income groups, while it is negative (-0.2 percent) for the MID income group and positive (0.16 percent) for the LOW income group. Similar results hold for the median. When we look at the population-weighted averages, however, the effects are negative for the ADV and MID income groups, zero for the LoMID income group, and positive for the LOW and HiMID income groups. Finally, calculating trade effects also allows us to look at trade balances; see Box 5-3. To some extent trade balances reflect trade creation and trade diversion effects (See Box 5-2, for a detailed discussion of examples).

*Box 5-3 TTIP impact on trade balance*

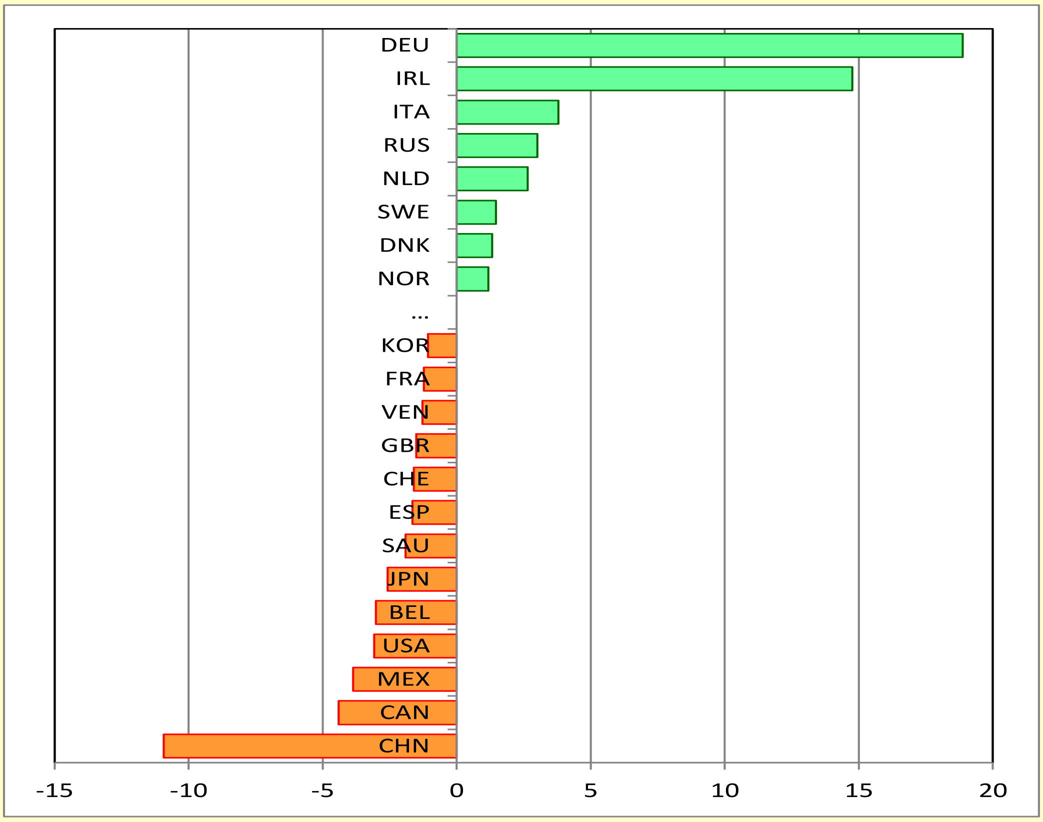
The implementation of TTIP will, of course, also affect other macroeconomic variables, such as a country's current account balance through changes in a country's trade balance. Figure 5-9 provides information regarding the 'improvement' in the trade balance as a result of TTIP in USD billion. The improvement is measured as the counterfactual trade balance minus the

[19] See also Table A-5 in the appendix for the effects on individual countries.

actual trade balance.[20] The figure lists the 21 countries for which the improvement in the trade balance is larger than USD 1 billion in absolute value. For the remaining 145 countries the absolute change in the trade balance is less than 1 billion, while it is even less than 0.2 billion for 4 out of 5 of these countries (for 115 countries, to be precise).

The largest deteriorations in the trade balance are in East Asia and North America, namely in China (10.9 billion), Canada (4.4), Mexico (3.9), USA (3.1), Belgium (3.0), and Japan (2.6). The largest improvements are in Europe, namely in Germany (18.9), Ireland (14.8), Italy (3.8), Russia (3.0), and the Netherlands (2.7). In relative terms (as a percent of average trade flows) the largest deteriorations are in Chad (-5.7 percent) and Luxembourg (-4.1 percent), while the largest improvements are in Ireland (+13.6 percent) and Belize (+2.7 percent). In this perspective TTIP looks to be particularly beneficial for Ireland.

*Figure 5-9 TTIP and estimated improvement of the trade balance, USD billion*




Source: calculations based on our trade data using the RTA approach; there are 145 non-listed countries with an absolute change less than 1 billion; for 115 countries the absolute change is less than 0.2 billion.

[20] Using the RTA approach. Similar results hold for the factor analysis.

## 5.6 Trade Effects with Factor Analysis

By their very nature RTA provisions come in groups. In order for an RTA provision to be active in our data set we have to have an RTA agreement in the first place. In most cases one agreement is associated with several provisions becoming active simultaneously. As a consequence, there is a fairly high degree of correlation between the various provisions, certainly if certain provisions are generally active at the same time. This degree of correlation makes the individual provision coefficient estimates reported in Tables 5-1 and 5-2 less reliable. We can be more at ease regarding the combination of estimates rather than the individual estimates.

One way of dealing with this problem from a statistical point of view is by using a factor analysis, which combines provisions that are correlated into one 'factor.' The factors themselves are (ideally) independent from one another. The construction of a factor is a statistical process without any consideration for the economic content of the underlying provisions, or whether it makes sense from a policy or economic point of view to group the building blocks of a factor together. Once this process is finished the factors can be interpreted, which is to some extent a subjective process. Because of the specific interest of The Ministry of Foreign Affairs regarding two factors, namely SPS and TBT, we started with a five factor analysis. This consisted of SPS and TBT separately and three combined factors based on our factor analysis. For ease of reference we call these factors broad competition, broad government, and broad institutions, respectively. These broad factors are constructed on the basis of the most important contributing provisions as follows (in order of statistical importance):

*Broad institutions* (equals one if at least one of the following provisions is covered)

- Consultations
- Definitions
- Dispute settlement
- Evolutionary clause
- Institutional framework
- Objectives

*Broad competition* (equals one if at least one of the following provisions is covered)

- Agriculture
- Capital mobility
- Competition
- Import restrictions
- Investment

- (SPS, see text)

*Broad government* (equals one if at least one of the following provisions is covered)
- ADCVM
- Customs administration
- Export restrictions
- Public procurement
- State aid

*Table 5-4 TTIP trade change effects; 3 factor RTA approach, relative change in percent per group or income class*

| *a. Trade effects* Group | Mean normal | Mean pop wgh | Median | Stand. dev. | Number countries | Population milion |
|---|---|---|---|---|---|---|
| TTIP countries | 4.24 | 3.18 | 3.79 | 2.20 | 29 | 823 |
| RoW countries | 0.10 | -0.04 | 0.09 | 0.62 | 137 | 5,994 |
| ADV | 0.12 | -0.30 | 0.03 | 0.64 | 18 | 316 |
| HiMID | 0.10 | 0.65 | 0.18 | 0.65 | 13 | 308 |
| MID | -0.05 | -0.35 | -0.06 | 0.69 | 29 | 2,143 |
| LoMID | 0.07 | 0.07 | 0.03 | 0.65 | 33 | 2,288 |
| LOW | 0.22 | 0.26 | 0.23 | 0.53 | 44 | 939 |
| *b. Change compared to RTA dummy approach* | | | | | | |
| TTIP countries | -0.03 | 0.05 | -0.02 | -0.08 | 0 | 0 |
| RoW countries | 0.09 | 0.13 | 0.04 | -0.11 | 0 | 0 |
| ADV | 0.09 | 0.15 | 0.06 | -0.08 | 0 | 0 |
| HiMID | 0.09 | 0.06 | 0.11 | -0.08 | 0 | 0 |
| MID | 0.14 | 0.18 | 0.15 | -0.13 | 0 | 0 |
| LoMID | 0.10 | 0.11 | 0.06 | -0.10 | 0 | 0 |
| LOW | 0.06 | 0.07 | 0.00 | -0.12 | 0 | 0 |

Source: authors's calculations based on all information; pop wgh = population weighted average; Stand. dev. = standard deviation; see Table 2-1 for income classes; 3 factor RTA dummy approach

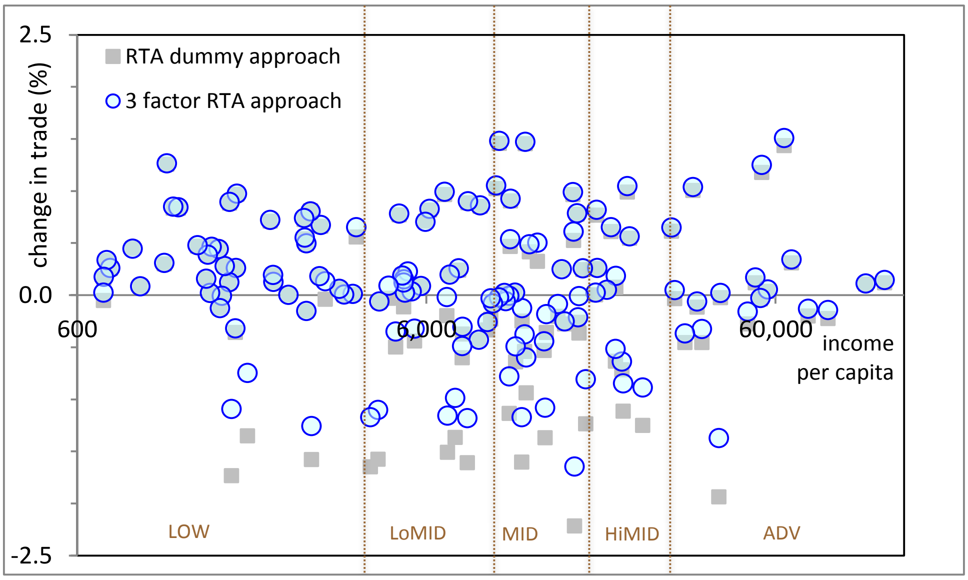
We were aware that the individual provisions SPS and TBT statistically fall under the broad competition factor (although they are not the most important provisions for this factor. The effect of SPS is positive, that of TBT marginal). Not surprisingly, therefore, the contribution of these individual provisions turned out to be small, such that we decided to drop them from

our subsequent analysis. The interested reader can subsume their impact as part of the broad competition factor.

Table 5-4 provides, similar to the analysis in Table 5-3, summary information on the TTIP trade effects for the TTIP countries themselves and the RoW countries using our provision-based factor analysis. The RoW group is again subdivided into our five income classes. The factor-based TTIP trade effects are clearly positive for the TTIP countries, with an average increase of 4.24 percent, a median of 3.8 percent, and a standard deviation of 2.2 percent (see panel *a* of Table 5-4). Again the effect for the TTIP countries is somewhat smaller if we use a population-weighted average, namely 3.2 percent instead of 4.24 percent. The average impact of TTIP for the trade flows of the 137 RoW countries with a total population of 6 billion people based on the factor analysis is positive (rather than zero). This holds for all income classes, except the MID income group. The relative decline for this group using the factor analysis, however, is smaller than using the standard RTA approach presented in section 5.5. Panel b of Table 5-4 compares the effects of the factor analysis of this section to that of the RTA analysis of section 5.5. The comparison shows that the factor analysis (which takes RTA heterogeneity into consideration) on average has a positive effect for RoW countries. The shaded elements indicate negative deviations from the RTA dummy analysis. For TTIP countries the unweighted mean and median effects are marginally less positive, while the population-weighted mean effect is slightly positive. In all cases the standard deviation declines, such that individual country results are more closely lumped together for all income groups.

To illustrate the main difference between the factor-based RTA analysis and the RTA dummy approach for the RoW countries, Figure 5-10 shows both effects in one figure. It is not a bubble diagram to facilitate the comparison for individual countries. The trade effects using the RTA approach discussed in section 5.5 are indicated by (grey) squares. The factor-based trade effects discussed in this section are depicted by (blue) circles. In most cases it is not hard to match the grey square with the concomitant blue circle for the country under consideration (since the income per capita is the same).

*Figure 5-10 TTIP trade effects for RoW; factor-based RTA effect compared to RTA dummy approach, relative change in percent*




Source: calculations based on our trade data and World Development Indicators; GNI PPP in constant 2011 $; bubbles proportional to size of populaton; 137 countries in total.

At the bottom part of the figure (below the horizontal line with no change) it is clear that the negative trade effects are less negative with the factor-based approach rather than the RTA approach. For RoW countries that are adversely affected by TTIP the estimated effect is thus considerably smaller. At the top part of the figure (above the horizontal line) it is harder to distinguish between the grey squares and the blue circles, simply because they tend to be on top of one another. For those countries the factor-based analysis is thus essentially the same as the RTA approach. The overall conclusion is that taking RTA heterogeneity into consideration changes the trade effects of TTIP for RoW countries somewhat (more positive on average), but not dramatically.

# 6 SUPPLY CHAIN EFFECT AND LOW INCOME COUNTRIES

## 6.1 Supply chain effects

As we have indicated above, third country effects of RTAs are complicated, not only because trade agreements themselves are heterogeneous and countries are engaged in many RTAs with various combinations of countries, but also because international trade itself has become more complex. The latter aspect of trade is related to the fragmentation of production processes in 'supply chains' and could potentially interfere with trade creation and diversion aspects of agreements. Section 2 highlighted some of the issues involved. To get some grip on

these aspects we will present stylized facts about these supply chains that will indicate if potential TTIP effects should be modified if one explicitly deals with fragmented production processes. As we focus on low income countries it is important to discuss if and how these countries are part of global production processes, and if so to what extent.

If low income countries are an integral part of global supply chains, an increase of trade flows between the EU-USA is potentially felt throughout the supply chain. This could compensate for possible trade diversion aspects of TTIP. If countries are not part of a global supply chain an increase in trade between the EU and USA potentially does not compensate for trade diversion aspects of the trade agreement. On the other hand, if TTIP causes the supply chain to switch from low-income-country-and-USA or low-income-country-and-EU to an EU-USA based supply chain, then being part of a supply chain may instead worsen rather than improve your situation. Two observations are important in this respect. First, once established supply chains tend to be rather stable and are not easily replaced by competitors, so the latter perspective (a switch to an EU-USA based supply chain as a result of TTIP) seems less likely. Second, the building of supply chains is an ever ongoing and ever more-involved and complicated dynamic process that is notoriously difficult to predict. From that perspective, any argumentation of alternative TTIP outcomes for RoW countries than the more standard results discussed above (in chapters 3-5) which is based on being part of or results from changes in supply chains is, indeed, highly speculative.

*Box 6-1 Intra-industry trade and Grubel-Lloyd index*

Supply chains are generally associated with intensive, two-way trade flows (both export and imports) in a certain sector, or so-called *intra*-industry trade. How do we measure such intra-industry trade, the extent of trade in similar goods? Although various options are available, the most often used measure is the Grubel-Lloyd index, which is both simple and intuitively appealing. Let $Ex_i$ be the exports of sector *i* and let $Im_i$ be the imports of sector *i*, then the Grubel-Lloyd index $GL_i$ for sector *i* is defined as

$$(6.1) \quad GL_i = 1 - \frac{|Ex_i - Im_i|}{Ex_i + Im_i}$$

If a country only imports or only exports goods or services within the same sector, such that there is no intra-industry trade, the second term on the right-hand side of equation (6.1) is equal to 1 (either $Ex_i/Ex_i = 1$ or $Im_i/Im_i = 1$), such that the whole expression reduces to 0. Similarly, if the exports of goods or services are exactly equal to the imports of those goods or

services within the same sector ($Ex_i = Im_i$), the second term on the right-hand side of equation (6.1) is equal to zero, such that the whole expression reduces to 1. The Grubel–Lloyd index therefore varies between 0, indicating no intra-industry trade, and 1, indicating only intra-industry trade. Section 6.2 discusses a supply chain example, section 6.3 provides an overview of the Grubel-Lloyd index for various countries, and section 6.4 looks at this index in more detail.

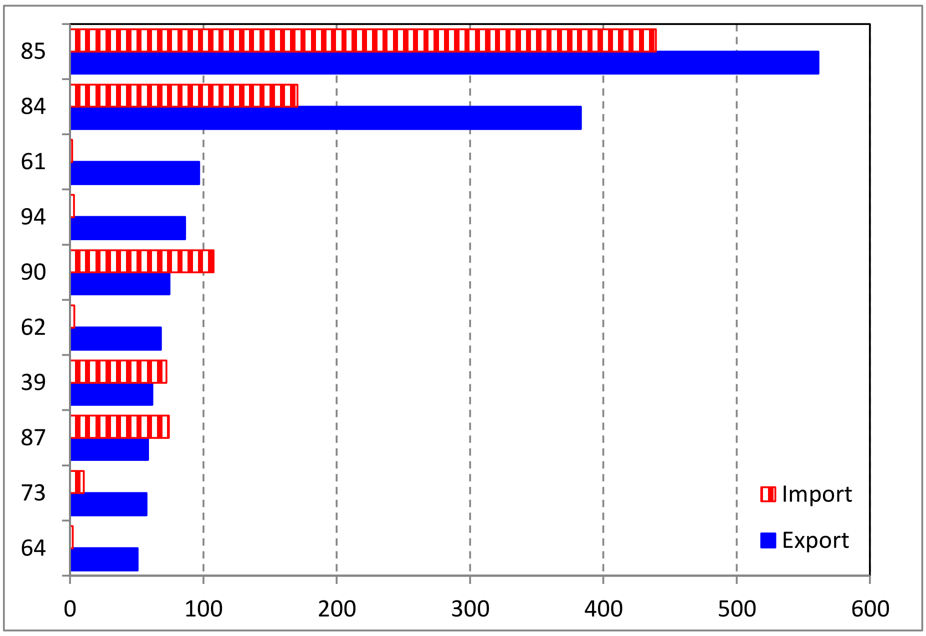
Before we continue our analysis on supply chains for low income countries it is instructive to discuss in some detail the workings of what is probably the world's biggest supply chain and best-studied example today, namely the partially China-based electronics sector. Readers already familiar with the workings of supply chains or this particular sector in China can skip section 6.2 and continue directly with section 6.3.

## 6.2 Importance of supply chains: China case study

With an export value of $2209 billion, or about 12.7 percent of the world total, China was the world's largest exporter in 2013. So what was China exporting? At the Harmonized System 2-digit level, the United Nations Comtrade website identifies 96 different sectors. Figure 6-1 provides an overview of China's ten largest export sectors, together accounting for 68 percent of China's total exports. By far the largest export sector, with a value of $561 billion which accounts for more than 25 percent of China's exports, is number 85: electrical, electronic equipment (henceforth electronics, for short). Other important export sectors include machinery (84), textiles (61, 62), furniture (94), and optical instruments (90).

Figure 6-1 shows the size of the import flows into China for the top ten export sectors. In some sectors, such as textiles (61, 62), furniture (94), and footwear (64), imports are very low. Using the Grubel-Lloyd (GL) index (see Box 6-1), which ranges from zero to 100 percent and measures the extent of *intra*-industry at the 2-digit level, these are clear examples of *inter*-industry trade flows (GL index below 10 percent): the good is exported, but not imported. Similarly, there are examples of inter-industry trade sectors where the good is imported but not exported, such as (not shown) ores, slag & ash (26) and pulp of wood (17).

*Figure 6-1 Top Ten Export Sectors in China, 2-digit HS, 2013*

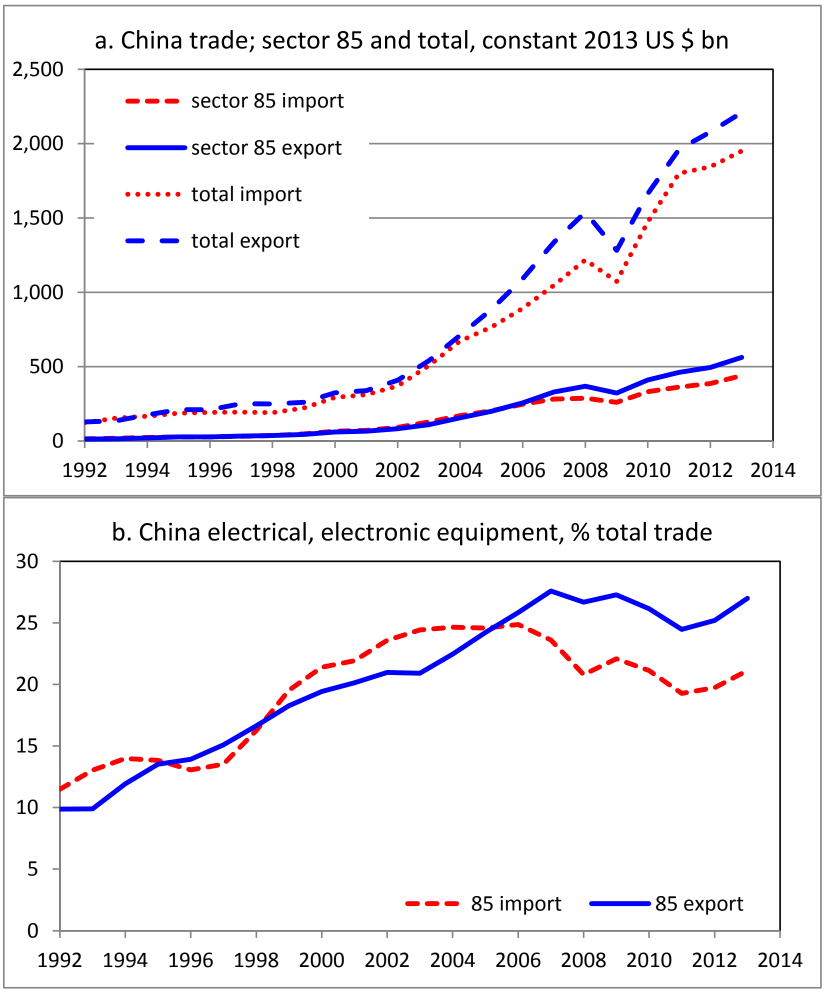



Source: based on UN Comtrade data; billion US $; short description: 64 = footwear; 73 = articles of iron and steel; 87 = vehicles other than railway or tramway; 39 = plastics; 62 = apparel and clothing, not knitted or crocheted; 90 = optical and medical instruments; 94 = furniture; 61 = apparel and clothing, knitted or crocheted; 84 = nuclear reactors, boilers and machinery; 85 = electrical, electronic equipment.

On the other hand, as also illustrated in in Figure 6-1, there are many sectors where the measure of intra-industry trade is very high: the good is exported and imported at the same time. A prime example is the largest export sector, electronics (85), where imports are $439 billion and the GL index is 89 percent. Similar high intra-industry trade flows at the 2-digit level (GL index above 60 percent) in Figure 6-1 are observed for machines (84), optical instruments (90), plastics (39), and vehicles (87).

Panel *a* of Figure 6-2 illustrates how rapidly China's trade flows have increased over time. Measured in constant 2013 dollar, China's exports increased 17-fold since 1992, from $128 billion to $2209 billion, while its imports increased 16-fold, from $122 billion to $1950 billion. In both cases the compounded growth rate is above 14 percent per year. Trade flows for sector 85 increased even more spectacularly, namely a 31-fold increase in imports from $14 to $439 billion and a 45-fold increase in exports from $12 billion to $561 billion, with respective compounded growth rates of about 18 and 20 percent per year. As a consequence, as illustrated in panel *b* of Figure 6-2, the share of sector 85 in China's total trade flows (measured as the average of exports and imports in a given year) increased from 11 to 21 percent for imports and from 10 to 27 percent for exports.

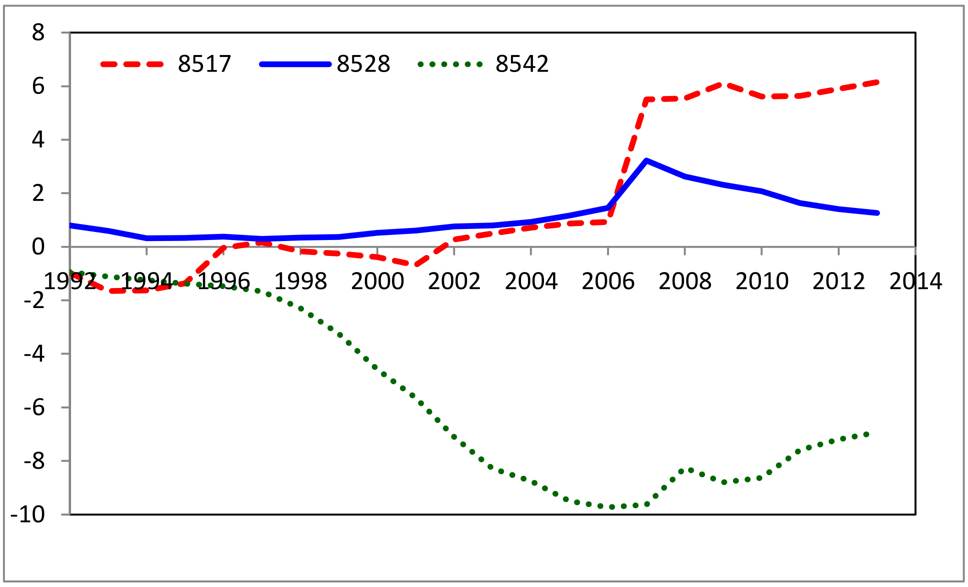
*Figure 6-2 China total Trade and Sector 85 Trade, 1992-2013*




Source: based on UN Comtrade data; in billion constant 2013 US $ (using GDP deflator); China total trade in a given year is the average of exports and imports.

There are two main types of intra-industry trade, namely *horizontal* intra-industry trade, which involves simultaneously importing and exporting goods in the same stage of the production process, and *vertical* intra-industry trade, which involves simultaneously importing and exporting goods in different stages of the production process. To get an indication regarding the type of trade flows in China's electronics sector, we look into more detail at the 48 sub-sectors into which these trade flows can be divided at the 4-digit level of the Harmonized System. Figure 6-3 shows the net-exports (as a percent of total trade) of the largest three sub-sectors (in absolute terms): 8517, 8528, and 8542. For ease of reference we label these telephones, televisions, and chips & components, respectively.

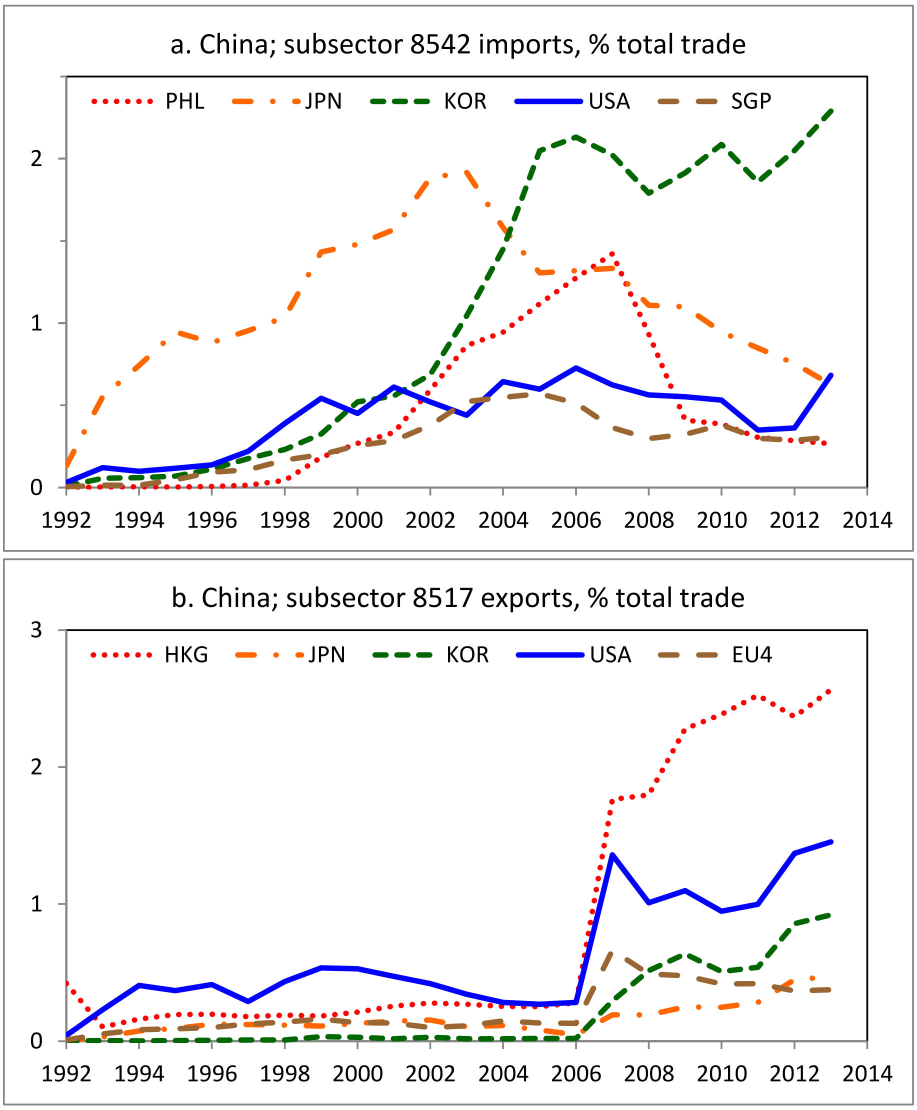
*Figure 6-3 China: Net Exports in Sub-Sectors of Electronics, % of Total Trade*




Source: based on UN Comtrade data; China total trade in a given year is the average of exports and imports; 8517 = electric apparatus for line telephony, telegraphy; 8528 = television receivers, video monitors, projectors; 8542 = electronic integrated circuits and microassemblies.

We note that China has been a net exporter of televisions since 1992. These net exports reached a peak of more than 3 percent of total trade in 2007, after which it declined to about 1.3 percent in 2013. We also note that China was initially a net importer of telephones since 1992 (except for 1997) until 2002, after which it became a large exporter of telephones, with a sharp increase in 2007 (the year of the introduction of the first *i*-phone) and rising above 6 percent of total trade in 2013. To enable the net exports of televisions and telephones China has always been a net importer of chips & components since 1992. These net imports rose particularly fast after 1997 to reach a peak of 9.7 percent of total trade in 2006 and then gradually decline below 7 percent of total trade in 2013. This information thus shows that China imports chips & components to be used in the, relatively labor-intensive, assembly of final electronics goods, such as televisions and telephones, which are subsequently exported to other countries.

*Figure 6-4 China: Imports of Chips and Exports of Telephones, % of Total Trade*




Source: based on UN Comtrade data; China total trade in a given year is the average of exports and imports; 8517 = electric apparatus for line telephony, telegraphy; 8542 = electronic integrated circuits and microassemblies; EU4 = Britain, Germany, France, and Italy.

Figure 6-4 provides an indication where the chips & components are imported from (panel *a*) and where the telephones are shipped to (panel *b*). Japan was initially the largest supplier of chips & components to the Chinese electronics sector. After a peak of almost 2 percent of total trade in 2003, however, Japan's influence declined gradually to about 0.6 percent in 2013. South Korea is currently the largest supplier of chips & components, taking over from Japan in 2005 and with a current import value of 2.3 percent of total trade. For some time the role of the Philippines as a supplier of chips & components was quite strong as well, but like Japan its influence declined since 2007, when imports peaked at more than 1.4 percent of total trade. Other important suppliers are the USA and Singapore. It should be noted that the

substantial influence of Taiwan on China's electronics sector is not visible in panel *a* of Figure 6-4 as these data are not provided by Comtrade, which is part of the United Nations and thus does not include information on Taiwan, which was replaced by China in 1971. Taken together, this illustrates that China imports chips & components mostly from nearby countries, such as Japan, Korea, Taiwan, the Philippines, and Singapore, and from the world's technological leader: USA.

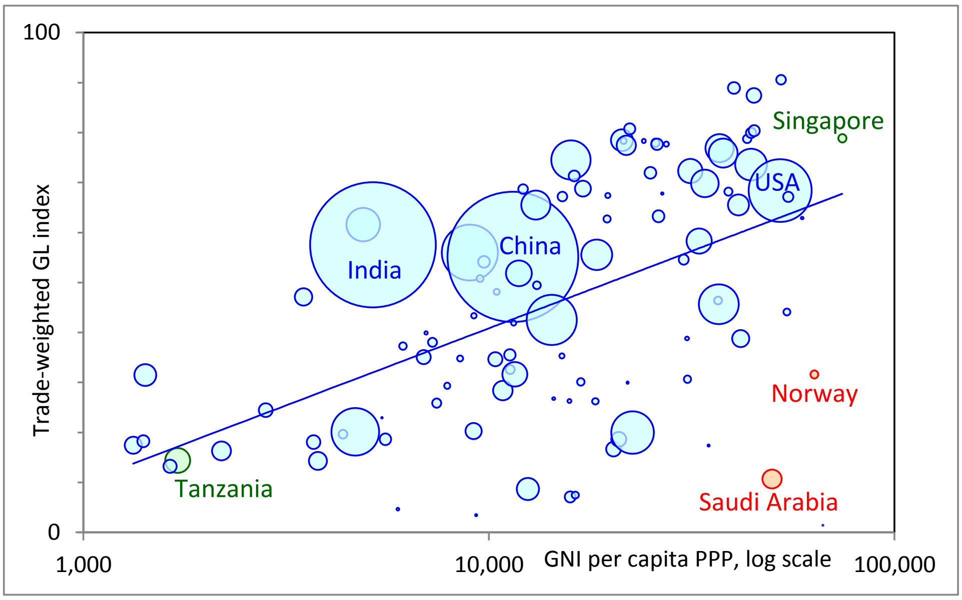
The most important destination countries for the export of telephones are given in panel *b* of Figure 6-4. For a long time the USA has been the main trading partner, also for telephones, with direct exports rising to 1.5 percent of total trade in 2013. On paper the role of leading destination country for telephones was taken over by Hong Kong in 2007, rising to 2.6 percent of total trade in 2013. This is only on paper, however, as Hong Kong's role as a trading hub implies that it re-exports the imported telephones to other countries, such as those listed in Figure 6-4. The other main destination countries are all advanced countries, such as South Korea, Japan, and the European Union (represented in the figure by EU4: Britain, Germany, France, and Italy). We thus observe that China imports chips & components, mostly from nearby countries, uses these to assemble final goods such as televisions and telephones, and then ships these goods to advanced markets in Asia, North America, and Europe. Since the final assembly stage of the production process is relatively labor intensive and under the assumption that China is a relatively labor abundant country, we thus note that China specializes in the part of the production process in accordance with its comparative advantage as explained by factor abundance theory. We also note that the gross export data cannot be used to adequately identify and measure these trade flows.

This example illustrates how modern supply chains operate. How different parts and components are produced in different countries. How these components are imported to a large extent not to be consumed locally but to be processed and re-exported, with additional domestically produced value added on top of what was imported. How countries at different stages of development are cooperating together in a (firm-coordinated) fashion to produce final goods, where each country specializes in producing part of the production process in accordance with its comparative advantage. This is a very important sector for China. Being part of this supply chain has been crucial for China's rapid economic development over the past fifteen years.

### 6.3 Measuring supply chains: a first look

As already noted in section 6.1, measuring global supply chains is notoriously difficult. As section 6.2 illustrates, it usually involves the simultaneous importing and exporting of goods and components at different stages of the production process in the same broader sector. It tends to involve locations in a range of different countries. The streams are usually co-ordinated at the firm level, involving large multinational enterprises. The inter-dependencies are important, as are the logistic problems. As a consequence, supply chains tend to involve multiple countries at different stages of economic development (which allows for differencies in comparative advantages between the countries), but these countries have to be relatively close together in space in order to manage the logistics and coordination problems. Many large supply chains therefore involve advanced countries and nearby middle income countries, such as the USA and Mexico, Germany and the Czech Republic, or Japan and China. Indeed, it is not too far-fetched to argue that some middle income countries became precisely that (middle income countries) because they benefited from being at the right stage of economic development in the neighborhood of advanced countries at the right time.

*Figure 6-5 Income per capita and intra-industry trade; 2-digit level, 2013*




Source: based on UN Comtrade data and World Development Indicators; income per capita PPP in constant 2011 international $; Grubel-Lloyd trade weights per (2-digit) sector based on sum of sector exports and imports divided by the country's total exports and imports; size of bubble proportional to population; 102 countries

Since supply chains involve two-way trade in the same sector, a first indicator of a country's involvement in international supply chains is based on calculating a trade-weighted average Grubel-Lloyd index of intra-industry trade (see Box 6-1 for details). The index thus indicates

the presence of trade within similar sectors. The assumption is that this correlates with supply chains in that particular sector; the higher the index the more important are supply chains.[21] As we will argue below (in section 6.4), the degree of sector detail is important.

Figure 6-5 depicts the correlation of the *2-digit* trade-weighted GL index with income per capita using recent data (2013) for selected countries (102 countries only). The bubble size is proportional to population. In general, low income countries such as Tanzania, with a per capita income level of $1709, have relatively low levels of (average) intra-industry trade, namely 14 percent trade-weighted at the 2-digit level. In contrast, high income countries such as Singapore, with a per capita income level of $74,444, have relatively high levels of intra-industry trade (79 percent). The regression line in Figure 6-5 explains about 27 percent of the variance in intra-industry trade and indicates that a 10 percent higher level of income per capita raises the level of intra-industry by 1.34 percentage points. China and the USA are two other typical examples. China is a middle income country ($11,467) and has a medium level of intra-industry trade (55 percent). The USA is a high income country ($52,287) and has a high level of intra-industry trade (68 percent). Some countries have a high level of income per capita but nonetheless a rather low level of intra-industry trade. This is related to wealth from natural resources (usually oil and gas), as illustrated by Saudi Arabia and Norway in Figure 6-5.[22] More importantly, note that the figure shows clearly that the reverse observation does not hold: there are no countries with high intra-industry trade levels and low income per capita (the upper-left corner in Figure 6-5 is empty).

Although this first look at supply chains measured using the GL index at the 2-digit level is useful for indicating that supply chains are more relevant at higher levels of income it is too coarse an indicator to show how crucial this is at *low* income levels for several reasons. First, it uses the most recent data available (2013) on the UN Comtrade website and as a consequence most countries from the LOW income group are absent in Figure 6-7 (only ten are included). Second, measuring supply chains using the GL index at the 2-digit level is too coarse. We already saw in the China example of section 6.2 that although the 2-digit level GL index was useful to indicate *something* was going on, we needed to dig deeper to the 4-digit

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[21] The implicit assumption is that most intermediate trade – within a supply chain – is trade within the same sector.

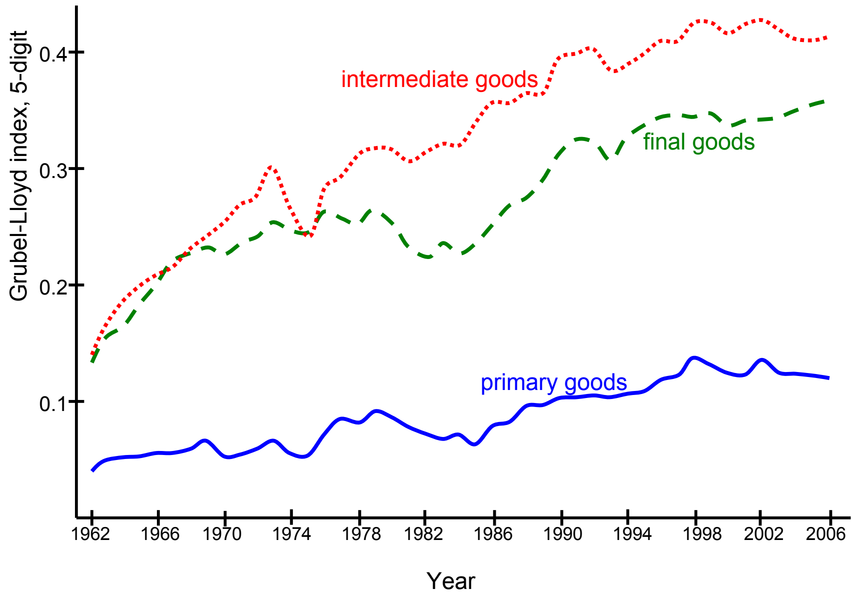
[22] Other examples are Kuwait and Qatar, not shown in the figure.

level to get some indication of *what* was going on. If we truly want to look at supply chains in more detail we have to dig even deeper to the 5-digit and 6-digit level, as studies for the i-phone, i-pad, and so on have shown. Fortunately, we can use the work of Marius Bruehlhart (2008), in preparation for the World Bank (2009) World Development Report, who provides detailed information on the GL index at the 5-digit level. The next section will show that this level of detail is important.

### 6.4 Measuring supply chains: a more detailed look

Our first more detailed look concerns the type of goods associated with supply chains at the 5-digit level. Figure 6-6 depicts the evolution of intra-industry trade when we divide the goods into three broad categories (based on the United Nations' broad economic categories), namely primary goods (for example oil, cereals or metals), intermediate goods (such as electronic components or gear boxes), and final goods (ready to be sent to the consumer). The figure indicates that the degree of intra-industry trade is substantially higher for final goods and intermediate goods than for primary goods. Countries specializing in the export of primary goods (such as oil) thus tend to have lower levels of intra-industry trade. The figure also indicates that the degree of intra-industry trade is rising for all three types of goods categories.

*Figure 6-6 Global intra-industry trade and type of good, 5-digit level*

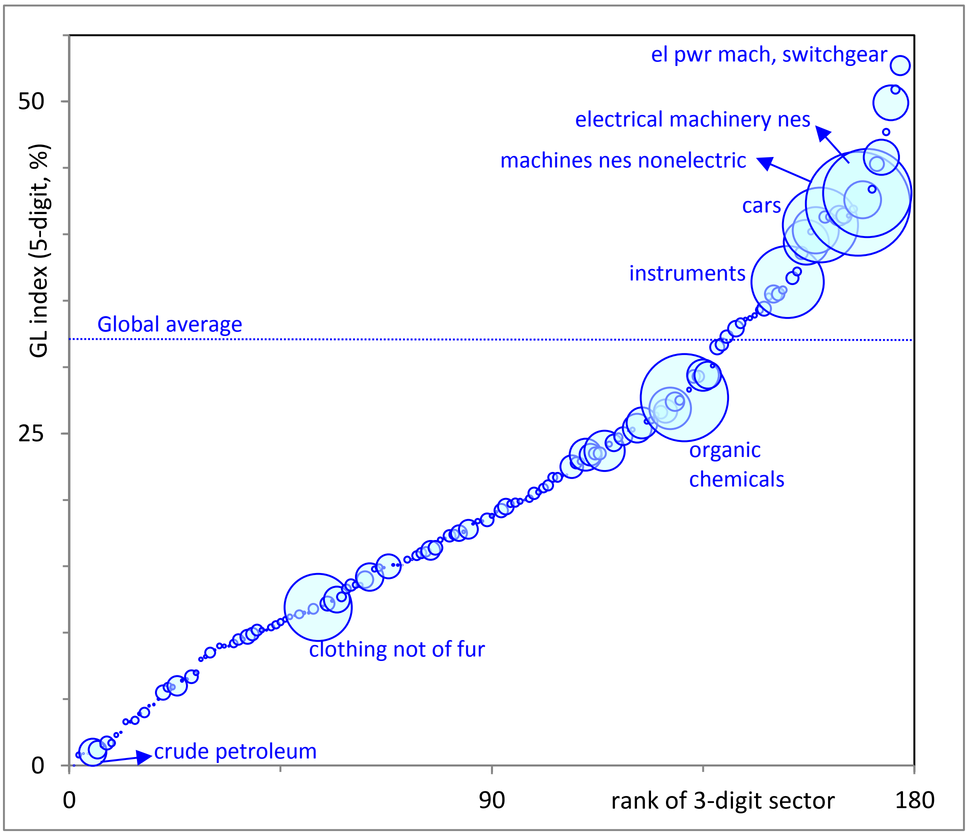



Source: figure based on Bruehlhart (2008) data at SITC (third revision) 5-digit level; depicted graphs are global weighted averages, taken from van Marrewijk (2012).

Next, we take a closer look at the sectors most intensively involved in supply chains. To do that we calculate the global trade-weighted average GL index at the 5-digit level for each 3-digit sector, thus summing over all 5-digit subsectors for any given 3-digit sector across all

countries in the world. At the 3-digit level we identify 177 sectors, which we rank from low to high GL index (5-digit, %). Figure 6-7 shows the result of this ranking with bubble size proportional to the size of that sector's total trade flows. The trade-weighted global average over all sectors is a GL index of 31.9 percent.

*Figure 6-7 Global average GL index (5-digit level, %) per 3-digit sector*




Source: figure based on Bruehlhart (2008) data at SITC (third revision) 5-digit level; data for 2006; bubbles proportional to the size of global trade flows; sectors ranked from low to high GL index, 177 sectors; nes is not elsewhere specified; el pwr mach is electrical power machines; global trade weighted average is 31.9 percent.

Figure 6-7 shows that many of the world's largest trading sectors have a very high GL index. This holds, for example for instruments (and apparatus, 7% of world trade), cars (road motor vehicles, 7.6% of world trade), machines nes nonelectric (14.6% of world trade), and electrical machinery nes (10.5% of world trade). This is, of course, partially an inflated impression of the real importance of these sectors precisely because of the intensive two-way trade flows (which focuses on gross exports and not on value added exports, see section 6.5). The highest scoring sector is electrical power machines and switchgear (with a GL index of 52.7% representing 0.5% of world trade). Two large sectors are below the global average, namely organic chemicals (10.3% of world trade and very close to the global average) and clothing not of fur (6.1% of world trade).

*Box 6-2 Supply chain dependencies: Apple Watch and the taptic engine*

Being part of a supply chain also creates dependencies within the chain. A good example is provided by the taptic engine of the Apple Watch. This device creates a subtle feeling on the wrist if a new notification arrives. Apple was forced to delay the introduction of the Apple Watch in early 2015 because of technical problems with the taptic engine. At this stage of development two manufacturers were able to supply the taptic engine, namely AAC Technologies from China and Nidec from Japan. During the long-term testing phase Apple realized that some of the watches did not function properly if the taptic engine was supplied by the Chinese manufacturer. Before delivery started it thus had to dispose of all watched that had been produced with this component. It is clearly hard to substitute for this component as now the Japanese firm is the only one able to make the component (a substitutability problem that does not arise, for example, when delivery by a supplier of raw materials is interrupted). Apple's dependence on the Japanese Nidec firm, which was only able to gradually increase production of its components, thus resulted in a delay of the introduction of the Apple Watch.

Source: rtlnieuws.nl, 30 April 2015

Figure 6-7 makes clear that if your country specializes in the production of goods in sectors with a low GL index globally, then your country is likely to score low on the GL index at the country level as well. This holds, for example, for countries specializing in the export of uranium; cotton; silk; jute; crude petroleum; non-ferrous base metal ore; rice; coal, coke & briquettes; and iron ore. These are the eight lowest scoring sectors in the bottom-left part of Figure 6-7 (not identified separately, except for petroleum). Countries specializing to a large extent in these types of sectors largely do not participate in global supply chains (Box 6-2).

*Table 6-1 Intra-industry trade (5-digit) and income per capita, OLS estimates*

| Country group | intercept | slope | $R^2$ | # obs |
|---|---|---|---|---|
| All countries | $-44.15^{***}$ | $5.78^{***}$ | 0.33 | 176 |
| | (0.0000) | (0.0000) | | |
| Excluding LOW countries | $-69.57^{***}$ | $8.34^{***}$ | 0.25 | 129 |
| | (0.0000) | (0.0000) | | |
| LOW countries only | -1.02 | 0.20 | 0.01 | 47 |
| | (0.6595) | (0.5139) | | |

Source: authors's calculations, see Figure 6-7; p-values in parantheses; $^{***}$ indicates significance at 1% .

Our next task is then to identify the countries that are intensively involved in global supply chains identified using the 5-digit GL index and to identify the countries that are not. To do that we calculated each country's trade-weighted average GL index. To illustrate the connection with different levels of economic development and country size, we plotted the results relative to income per capita (log scale) for each of the income groups using bubbles proportional to population size. Our findings are depicted in Figures 6-8 and 6-9 and our analysis is summarized in Tables 6-1 and 6-2.

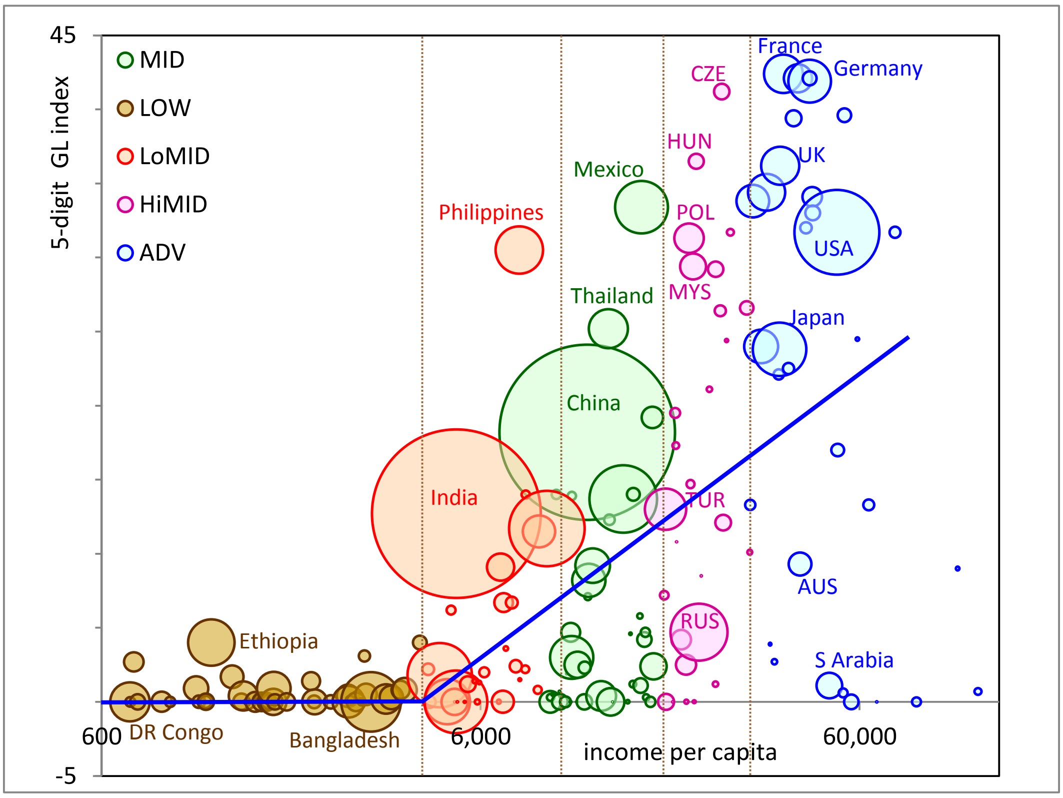
We now have information for a much larger group of countries (176 in total), including a substantial number of LOW income countries (47 in total). One look at Figure 6-8 immediately illustrates three important points.

First, the 5-digit trade-weighted GL index is able to adequately identify all countries at different levels of economic development that we *know* are intensively involved in global supply chains. This holds, for example, for the Philippines for the LoMID countries, for Mexico, Thailand, and China for the MID countries, for the Czech Republic, Hungary, Poland, and Malaysia for the HiMID countries, and for France, Germany, UK, USA, and Japan for the ADV countries. The geographical component of these links is also noticeable, as is illustrated for the low score for Australia, which is too far away from most other countries to be a succesful link for most types of global supply chains.

Second, there is a strong positive association between the level of economic development and the degree of participation in global supply chains. The first line of Table 6-1 illustrates this using a simple regression for all countries in Figure 6-8, leading to a highly statistically significant coefficient of 5.78 for the effect of log income per capita on the GL index.

Third, and most striking: the *poorest* countries in the world do not participate in global supply chains. There are 47 LOW income countries included in Figure 6-8. They all have a low GL index, the variation in these scores is minimal, and there is no discernable increase within this group as income per capita rises. The last line of Table 6-1 makes this clear as a regression using only the LOW countries leads to highly insignificant results for both slope and intercept.

*Figure 6-8 Grubel-Lloyd index per country; trade-weighted average, 5-digit level*




Source: figure based on Bruehlhart (2008) data combined with World Development Indicators; income per capita PPP in constant 2011 international $ (log scale); trade-weighted GL index at SITC (third revision) 5-digit level per country; 176 countries; the solid line is a regression line for LOW countries, combined with a regression line for all other countries, see Table 6-1 for details.

Excluding the LOW countries from the sample, as is done in the second row of Table 6-1, thus increases the slope of the estimated coefficient for the remaining countries from 5.78 to 8.34, indicating an overall stronger positive association between the level of economic development and the participation in global supply chains once a critical income per capita level is reached. The estimated intercept for this critical level on the horizontal income per capita axis is at 4,185 PPP international dollar, which is essentially *on* the cut-off level for LOW versus LoMID countries ($4,204; the deviation is less than 0.5%).

Table 6-2 provides summary statistics for the world as a whole and each income group. The most important results are illustrated in Figure 6-9. For the LOW income group there is basically no participation in global supply chains. The score is low for both the unweighted and population-weighted mean. Moreover, there is almost no variation, leading to a very low standard deviation for this income group (1%). The maximum score for the LOW income group is only 4 percent.

*Table 6-2 Intra-industry trade (GL 5-digit) and income per capita country statistics*

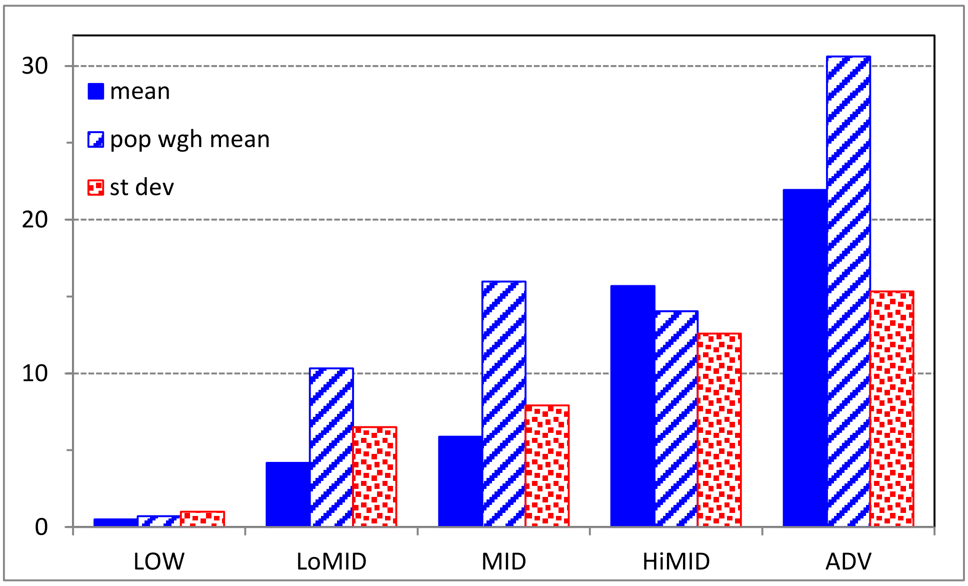
| | mean | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | normal | pop wgh | median | st dev | min | max | # co | pop |
| World | 8.6 | 14.1 | 1.9 | 12.2 | 0.0 | 42.4 | 176 | 6,828 |
| LOW | 0.5 | 0.7 | 0.0 | 1.0 | 0.0 | 4.0 | 47 | 948 |
| LoMID | 4.2 | 10.3 | 1.5 | 6.5 | 0.0 | 30.5 | 31 | 2,250 |
| MID | 5.9 | 16.0 | 2.4 | 7.9 | 0.0 | 33.4 | 39 | 2,210 |
| HiMID | 15.7 | 14.1 | 13.0 | 12.6 | 0.0 | 41.2 | 27 | 408 |
| ADV | 21.9 | 30.6 | 23.9 | 15.3 | 0.0 | 42.4 | 32 | 1,012 |

Source: authors's calculations, see Figure 6-7; normal mean is unweighted average; pop wgh is population-weighted average; st dev is standard deviation; min is minimum; max is maximum; # co is number of countries; pop is population (in millions).

For the remaining income groups all indices rise as the level of economic development rises. The mean, the median, and the standard deviation all go up consistently. The only exception is the minimum, which remains at zero for all income groups, and a small decrease for the population-weighted average when going from the MID to the HiMID group. The maximum score is reached for France at 42.4 percent. Other countries scoring above 40 percent are: Czech Republic, Germany, Canada, and Austria.

We have thus concluded that LOW incom countries do not participate actively in global supply chains. Most of these countries are in Africa, namely 34 out of 47 or 72 percent. Another 5 countries are in Southeast Asia and the Pacific, 3 are in Southern Asia, 2 are in Central Asia and Caucasus, 2 in Central America and the Caribbean, and 1 in Western Asia. Indeed, when analyzing his results, Bruehlhart (2008) discusses in detail how there is essentially no intra-industry trade at the 5-digit level for the countries of the Central African Economic and Monetary Community (CEMAC), the West African Economic and Monetary Union (WAEMU), the East African Community (EAC), and the Southern Africa Customs Union (SACU). From our perspective, any special impact of the TTIP agreement working through global supply chains is largely irrelevant for LOW income countries as they do not participate in these supply chains.

*Figure 6-9 Grubel-Lloyd index (5-digit) by income group*




Source: figure based on Bruehlhart (2008) data combined with World Development Indicators, see Table 6-2 for details; average trade-weighted GL index at SITC (third revision) 5-digit level per country; mean is unweighted country average within the income group; pop wgh mean is population-weighted country average within the income group; st dev is standard deviation within the income group.

## 6.5 Trade in value added

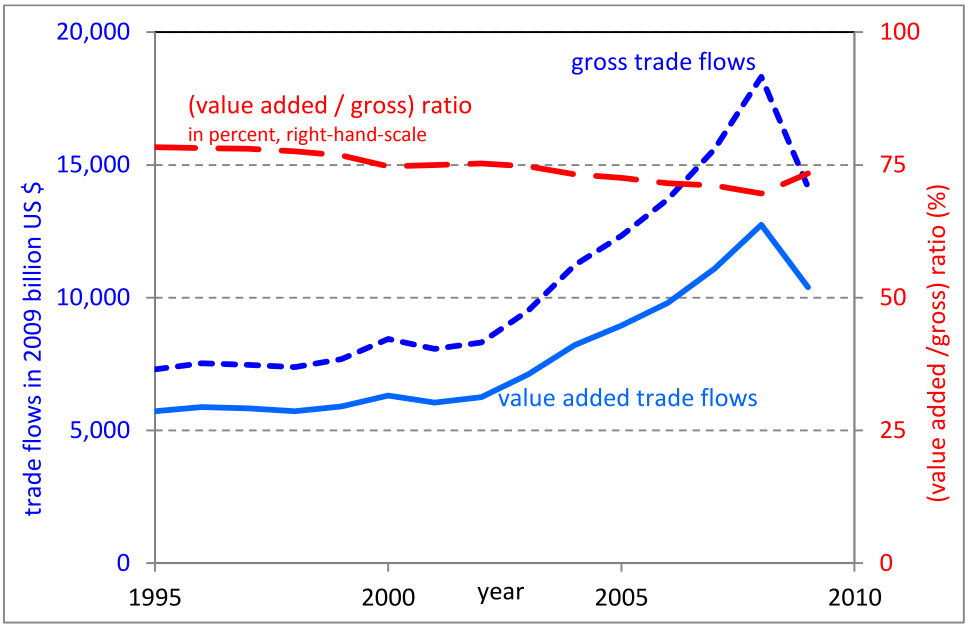
Traditionally international trade is analyzed by using data on gross exports and imports. This is the trade that crosses national borders and is registered by custom officials.[23] The assumption is that gross trade flows provide sufficient information to analyze the structure of international trade and, for example, comparative advantage. As long as international fragmentation is limited gross trade flows indeed provide this information. This, however, is no longer the case. International fragmentation of the production process has become a salient characteristic of the world economy and international trade flows no longer, or to a lesser extent than it used to be, reflect what a country is producing and exporting (see Brakman, van Marrewijk, and Partridge, 2015 for some recent references).

There have been several recent attempts to remedy this shortcoming by constructing estimates of value-added trade flows across countries rather than gross export flows. The EU-Groningen constructed World Input-Output Data (WIOD) database, which is now joining forces with the OECD's Trade in Value Added (TiVA) database, is a prime example. The WIOD trade data identify 40 individual countries and a 'Rest of the World' (RoW) group of

[23] Except for intra-EU trade, where it is estimated.

countries to characterize global trade flows in the period 1995–2009.[24] The countries are the 27 countries of the EU (as of January 1, 2007), and: Australia, Brazil, Canada, China, India, Indonesia, Japan, Mexico, Russia, Taiwan, Turkey, and the USA. Together these countries represent about 85% of world GDP. Furthermore, the data cover 35 sectors, and are constructed by combining national Input-Output tables with international trade data.

*Figure 6-10 Global trade flows and value-added / gross ratio, 1995–2009*




Source: Brakman and van Marrewijk (2015).

Expressed in constant 2009 US dollars, global gross trade flows increased by about 94 percent in this period (see Figure 6-10), from $7,305 billion in 1995 to $14,160 billion in 2009.[25] Global gross trade flows peaked, however, in 2008 at $18,315 billion (and the drop in 2009 was almost 23 percent). Measured in value-added terms, global trade flows increased in the same period by about 82 percent, from $5,722 billion in 1995 to $10,397 billion in 2009. As illustrated in Figure 1, value-added trade and gross trade move up and down quite closely, although the gap between these flows is gradually increasing since value added trade rises more slowly. As a consequence, the *ratio* of value-added trade to gross trade is gradually

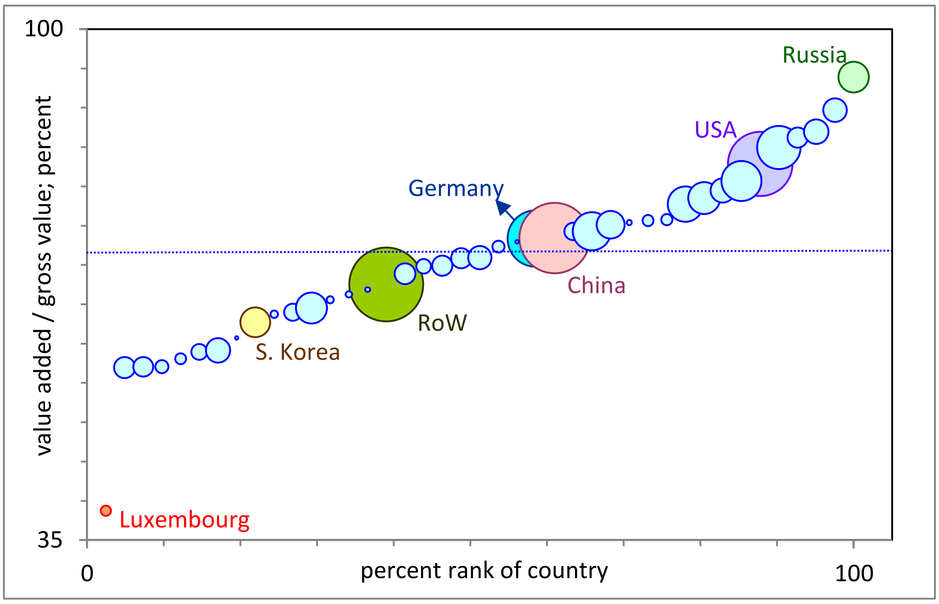
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[24] See: www.WIOD.org

[25] Based on WIOD data; we converted current dollars to constant dollars using the US GDP deflator.

declining over time, from 78 percent in 1995 to 73 percent in 2009 (see Figure 6-10, where this ratio is depicted on the right-hand-scale of the figure).[26]

*Figure 6-11 Country trade; ratio of value-added over gross exports in percent, 2009*




Source: Brakman and van Marrewijk (2015); size of bubbles proportional to the size of value-added flows; the horizontal line depicts the median country value (71 percent).

There are substantial differences between countries regarding the ratio of value-added versus gross export flows. This is illustrated in Figure 6-11, where the countries are ranked from low-to-high value added / gross export flows (in percentage terms). The size of the bubbles is proportional to the size of value-added flows, while the horizontal line depicts the median value for value-added / gross export flows (equal to 71 percent).[27] The minimum value of 38.7 percent is reached for Luxembourg, a small open economy which depends heavily on intermediate inputs from other countries for its exports. The maximum value of 93.9 percent is reached for the Russian Federation, which makes only limited use of intermediate inputs from other countries. A closer look at Figure 6-11 reveals that Luxembourg is rather exceptional in this group of countries since its value-added / gross export ratio is more than 18 percentage points smaller than the second ranked country (Taiwan). This is probably related

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[26] The exception is the rise in the ratio of value-added to gross trade flows in 2009 as a consequence of the Great Recession. This rise appears to be temporary only, see Brakman, van Marrewijk, and Partridge (2015) and Los, Timmer, and de Vries (2015).

[27] The un-weighted average is 70.8 percent and the weighted average is 73.4 percent.

to the WIOD selection of countries, which only includes Luxembourg because it is a member of the European Union (which paid for the construction of the WIOD database) and not because of the size of its economy, population, or export flows. The ratio of value-added / gross export flows are close to the median country value for Germany and China, while the ratio is fairly high, for example, for the USA and fairly low for South Korea.[28]

As a method for identifying countries heavily involved in global supply chains on the basis of low value-added relative to gross export trade flows (indicating exports that heavily depend on importing value added components), the data presented in Figure 6-11 is only mildly useful. On the bottom-left end of the graph we indeed identify some countries that are intensively involved, such as Taiwan, Ireland, Hungary, the Czech Republic, Belgium, and South Korea (most of them not shown separately in the figure). On the other hand we do not identify other countries that are also heavily involved in other parts of the graph, such as Germany, China, France, USA, UK, and Japan (some of them also not shown separately in the figure). This problem is related to two main issues.

First, the value added data is based on rather aggregate data. This is necessarily so as the construction uses input-output tables that are only available on a rather coarse scale. This contrasts with the detailed information involving thousands of goods for gross exports at the 5-digit or 6-digit level. Actual supply chains are based on this much more minute detail. As a consequence, the value added to gross export ratio has a problem adequately identifying the large countries involved in global supply chains, as listed above.

Second, and related to this, the number of countries is limited. The data requirements for constructing value added trade flows are very high. As a consequence, only a small number of mostly advanced countries are included in the analysis. This makes it difficult to adequately assess the performance of the included countries relative to the excluded countries. It also means that countries with a lower level of economic development are excluded from the analysis. Indeed, of the 40 countries in the WIOD database only two countries belong to the LoMID income group (India and Indonesia) and *none* to the LOW income group.

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[28] It is better not to pay too much attention to RoW in Figure 6-11 as this is an artificial construct combining all other countries in the world.

*Table 6-3: Poisson Estimation Results (Intensive Margin);WIOD-TIVA data*

| | WIOD | TiVA | TiVA Only Manufactures | TiVA Only Services |
|---|---|---|---|---|
| ln(Distance) | -0.653*** | -0.653*** | -0.676*** | -0.585*** |
| | (0.0385) | 0.0332) | (0.0364) | (0.03215) |
| Common border | 0.275*** | 0.285*** | 0.311*** | 0.326*** |
| | (0.0858) | (0.0714) | (0.0788) | (0.0747) |
| Common language | 0.242 | 0.208 | 0.254 | 0.254 |
| | (0.0754) | (0.0830) | (0.0763) | (0.0763) |
| GSP | -0.046* | -0.073 | -0.023 | -0.096* |
| | (0.0731) | (0.0531) | (0.0596) | (0.0542) |
| RTA | 0.187** | 0.223** | 0.270** | 0.227** |
| | (0.0960) | (0.0773) | 0.0856) | (0.0693_ |

Robust standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Estimates obtained using Poisson (poi2hdfe in STATA).

As a result of these problems the value added trade data is of limited use to evaluate the consequences of TTIP for low income countries. Table 6-3 provides Poisson estimates for the intensive margin of trade with both, WIOD and TiVA data. In the TiVA dataset we distinguish between manufactures and services. Table 6-3 shows that results are comparable to those in Table 5-2, and that these data-sets do not change our conclusions.

## 7 CONCLUSIONS

Currently the EU and the USA are negotiating a new Regional Trade Agreement (RTA): The Transatlantic Trade and Investment Partnership (TTIP). After the official announcement in February 2013, the negotiations started in July 2013, and are still ongoing. If successful, TTIP will be the largest RTA to date. By reducing all sorts of barriers to trade, the European Commission expects positive trade and welfare effects for the members of TTIP and for the Rest of the World.

The literature on the effects of TTIP is less optimistic. Although there is consensus on the positive effects for the EU and USA, this consensus is lacking with respect to third country effects. Most studies indicate that TTIP has trade diversion effects for third countries.

Calculations with respect to third countries are, however, met with many uncertainties: many countries have a RTA with the EU or the USA, and will therefore hardly be affected by adverse trade diversion effects, for some countries trade with the EU or USA is not very important, and some countries might have strong supply chain linkages with the EU or USA and an increase of trade between TTIP partners might be felt throughout the supply chain.

Importantly, in most studies TTIP is included rather rudimentary; as a binary dummy (an agreement is active or not), or various elements are lumped together in a ‘tariff-equivalent’ of all elements in the treaty. We address the heterogeneity of TTIP explicitly, and show that this is important to assess the results. Furthermore, supply chain effects might mitigate the negative trade diversion effects for third countries. We also provide stylized facts on the relevance of supply chains.

We distinguish 26 different policy areas in trade agreements, organized in three groups. The first group involve the so-called $WTO^{+}$ provisions that are within the current mandate of the WTO.

The second group is not yet part of WTO negotiations and is labelled $WTO^{X}$ provisions.

The remaining provisions relate to institutional quality (IQ). Using a state-of-the-art version of the gravity model (starting with 220 countries) to determine the contribution of various elements in trade agreements, we can calculate the counterfactual effects of TTIP.

We reach the following conclusions:

- The standard way of looking at RTAs with a simple binary dummy is neglecting the heterogeneity of RTAs.
- Different provisions have different effects; some contribute positively to trade, some negatively, and some not at all. Note, that all provisions are aimed at reducing barriers to trade or transaction costs in general, however some provisions have a negative effect. To some extent these provisions might *signal* the presence of a specific trade issue that affects a particular pair of countries and is the reason that it has become part of an agreement, whereas for other countries this trade issue does not limit trade.
- The variation for all income groups is substantial. Some big countries such as Canada and Japan, are faced with negative trade effects. Others, such as Russia and Turkey are faced with positive trade effects. Countries in the middle income group, particularly the bigger countries such as China, Brazil, and Mexico, are confronted with negative trade effects. The low income group, is generally confronted with positive trade effects, particularly for most African countries, such as Togo and Ethiopia (with Chad as an exception). The effects are still negative, however, for some poor Asian (Cambodia) and American (Haiti) countries. The overall conclusion in the literature that trade diversion effects for third countries are negative needs to be qualified.

- Provisions come in clusters: if one finds provision *A*, it is likely to also find provision *B* or *C*. Grouping provisions into groups of provisions that are correlated show that provisions mutually reinforce each other; mitigating the negative trade effects for the MID income groups. For negotiators this might be important; focus on groups of provisions that we labelled: Broad competition, Broad Government, Broad Institutions.
- Detailed data on supply chain linkages indicate that it is unlikely that supply chain linkages are a strong force to mitigate possible negative trade diversion effects.

# APPENDIX

## TABLE A-1: TRADE AGREEMENTS AND COUNTRIES IN DATASET

Afghanistan-India
Albania-Bulgaria
Albania-Croatia
Albania-Macedonia
Albania-Moldova
Albania-Romania
Albania-Turkey
Andean Community (Cartanega)
Andean-MERCOSUR
Arab Maghreb Union (AMU)
Armenia-Georgia
Armenia-Iran
Armenia-Kazakhstan
Armenia-Kyrgyz Republic
Armenia-Moldova
Armenia-Russia
Armenia-Turkmenistan
Armenia-Ukraine
Asia Pacific Trade Agreement (APTA)
Association of South East Asian Nations FTA (ASEAN)
ASEAN-Australia-New Zealand
ASEAN-China
ASEAN-India
ASEAN-Japan
ASEAN-South Korea
Australia-Chile
Australia-New Zealand (ANZCERTA)
Australia-Papua New Guinea (PATCRA)
Australia-Singapore
Australia-Thailand
Australia-US
Azerbaijan-Georgia
Azerbaijan-Ukraine
Bahrain-US
Bangladesh-India
Belarus-Ukraine
Bhutan-India
Bolivia-Chile
Bosnia & Herzegovina-Bulgaria
Bosnia & Herzegovina-Croatia
Bosnia & Herzegovina-Macedonia
Bosnia & Herzegovina-Moldova
Bosnia & Herzegovina-Romania
Bosnia & Herzegovina-Slovenia
Bosnia & Herzegovina-Turkey
Brunei-Japan
Bulgaria-Estonia
Bulgaria-Israel
Bulgaria-Latvia
Bulgaria-Lithuania
Bulgaria-Macedonia
Bulgaria-Turkey
Canada-Chile
Canada-Colombia
Canada-Costa Rica
Canada-Israel
Canada-Peru
Caribbean Community (CARICOM)
CARICOM-Colombia
CARICOM-Costa Rica
CARICOM-Cuba
CARICOM-Dominican Republic
CARICOM-Venezuela
Central America-Dominican Republic-US
Central America-Mexico
Central American Common Market (CACM)
Central European Free Trade Agreement (CEFTA)
Chile-China
Chile-Colombia
Chile-Costa Rica
Chile-El Salvador
Chile-India
Chile-Japan
Chile-Mexico

Chile-Panama
Chile-Peru
Chile-South Korea
Chile-US
Chile-Venezuela
China-Hong Kong
China-India
China-Macao
China-New Zealand
China-Pakistan
China-Singapore
Common Economic Zone (CEZ)
Common Market for Eastern and Southern Africa (COMESA)
Commonwealth of Independent States (CIS)
Costa Rica-Mexico
Costa Rica-Panama
Croatia-Lithuania
Croatia-Macedonia
Croatia-Moldova
Croatia-Serbia & Montenegro
Croatia-Slovenia
Croatia-Turkey
Czech Republic-Estonia
Czech Republic-Israel
Czech Republic-Latvia
Czech Republic-Lithuania
Czech Republic-Slovak Republic
Czech Republic-Turkey
Dominican Republic-Panama
East African Community (EAC)
Economic Community of Central African States (ECCAS)
Economic Community of West African States (ECOWAS)
Economic Cooperation Organization (ECO)
Egypt-Jordan
Egypt-Turkey
El Salvador-Honduras-Taiwan
El Salvador-Panama
Estonia-Faroe Islands
Estonia-Hungary
Estonia-Slovak Republic
Estonia-Slovenia
Estonia-Turkey
Estonia-Ukraine
Eurasian Economic Community (EAEC)
European Community (EC)
EC-Albania
EC-Algeria
EC-Andorra
EC-Bosnia & Herzegovina
EC-Bulgaria
EC-Cameroon
EC-CARIFORUM States EPA
EC-Chile
EC-Cote d'Ivoire
EC-Croatia
EC-Cyprus
EC-Czech Republic
EC-Egypt
EC-Estonia
EC-Faroe Islands
EC-Hungary
EC-Iceland
EC-Israel
EC-Jordan
EC-Latvia
EC-Lebanon
EC-Lithuania
EC-Macedonia
EC-Malta
EC-Mexico
EC-Montenegro
EC-Morocco
EC-Norway
EC-Overseas Countries and Territories
EC-PLO
EC-Poland
EC-Romania
EC-San Marino

EC-Slovak Republic
EC-Slovenia
EC-South Africa
EC-Switzerland-Liechtenstein
EC-Syria
EC-Tunisia
EC-Turkey
European Economic Area (EEA)
European Free Trade Association (EFTA)
EFTA-Bulgaria
EFTA-Canada
EFTA-Chile
EFTA-Colombia
EFTA-Croatia
EFTA-Czech Republic
EFTA-Egypt
EFTA-Estonia
EFTA-Hungary
EFTA-Israel
EFTA-Jordan
EFTA-Latvia
EFTA-Lebanon
EFTA-Lithuania
EFTA-Macedonia
EFTA-Mexico
EFTA-Morocco
EFTA-PLO
EFTA-Poland
EFTA-Romania
EFTA-SACU
EFTA-Singapore
EFTA-Slovak Republic
EFTA-Slovenia
EFTA-South Korea
EFTA-Tunisia
EFTA-Turkey
Faroe Islands-Iceland
Faroe Islands-Norway
Faroe Islands-Poland
Faroe Islands-Switzerland
Georgia-Kazakhstan
Georgia-Russia
Georgia-Turkey
Georgia-Turkmenistan
Georgia-Ukraine
Guatemala-Mexico
Gulf Cooperation Council (GCC)
Honduras-Mexico
Honduras-Panama
Hungary-Israel
Hungary-Latvia
Hungary-Lithuania
Hungary-Turkey
India-Japan
India-Maldives
India-Nepal
India-Singapore
India-South Korea
India-Sri Lanka
Indonesia-Japan
Israel-Mexico
Israel-Poland
Israel-Romania
Israel-Slovak Republic
Israel-Slovenia
Israel-Turkey
Israel-US
Japan-Malaysia
Japan-Mexico
Japan-Philippines
Japan-Singapore
Japan-Switzerland
Japan-Thailand
Japan-Vietnam
Jordan-Singapore
Jordan-US
Kazakhstan-Kyrgyz Republic
Kazakhstan-Ukraine
Kyrgyz Republic-Moldova
Kyrgyz Republic-Russia

Kyrgyz Republic-Ukraine
Kyrgyz Republic-Uzbekistan
Laos-Thailand
Latin American Integration Association (LAIA)
Latvia-Poland
Latvia-Slovak Republic
Latvia-Slovenia
Latvia-Turkey
Lithuania-Poland
Lithuania-Slovak Republic
Lithuania-Slovenia
Lithuania-Turkey
Macedonia-Moldova
Macedonia-Romania
Macedonia-Slovenia
Macedonia-Turkey
Macedonia-Ukraine
Malaysia-Pakistan
Mauritius-Pakistan
Melanesian Spearhead Group (MSG)
Mercado Común del Sur (MERCOSUR)
MERCOSUR-Bolivia
MERCOSUR-Chile
MERCOSUR-India
Mexico-Nicaragua
Mexico-Northern Triangle
Moldova-Romania
Moldova-Serbia & Montenegro
Moldova-Ukraine
Morocco-Turkey
Morocco-US
New Zealand-Singapore
New Zealand-Thailand
North American Free Trade Agreement (NAFTA)
Oman-US
Pacific Island Countries Trade Agreement (PICTA)
Pakistan-Sri Lanka
Pan-Arab Free Trade Area (PAFTA)
Panama-Singapore
Panama-Taiwan
Peru-China
Peru-Singapore
Peru-US
PLO-Turkey
Poland-Turkey
Romania-Serbia & Montenegro
Romania-Turkey
Russia-Ukraine
Singapore-South Korea
Singapore-US
Slovak Republic-Turkey
Slovenia-Turkey
South Asian Preferential/Free Trade Agreement (SAPTA/SAFTA)
South Pacific Regional Trade and Economic Cooperation Agreement (SPARTECA)
Southern African Customs Union (SACU)
Southern African Development Community (SADC)
Syria-Turkey
Tajikistan-Ukraine
Trans-Pacific Strategic Economic Partnership (TPSEP)
Tunisia-Turkey
Turkmenistan-Ukraine
Ukraine-Uzbekistan
US-Vietnam
West African Economic and Monetary Union (WAEMU)

**COUNTRIES IN DATASET**

Afghanistan, Islamic Republic of
Albania
Algeria
Angola
Argentina
Armenia, Republic of
Aruba
Australia
Austria
Azerbaijan, Republic of
Bahamas, The
Bahrain, Kingdom of
Bangladesh
Barbados
Belarus
Belgium
Belize
Benin
Bermuda
Bolivia
Bosnia and Herzegovina
Brazil
Brunei Darussalam
Bulgaria
Burkina Faso
Burundi
Cambodia
Cameroon
Canada
Cape Verde
Central African Republic
Chad
Chile
China, P.R.: Hong Kong
China, P.R.: Macao
China, P.R.: Mainland
Colombia
Comoros
Congo, Democratic Republic of
Congo, Republic of
Costa Rica
Cote d'Ivoire
Croatia
Cuba
Cyprus
Czech Republic
Denmark
Djibouti
Dominica
Dominican Republic
Ecuador
Egypt
El Salvador
Equatorial Guinea
Estonia
Ethiopia
Faroe Islands
Fiji
Finland
France
French Territories: New Caledonia
Gabon
Gambia, The
Georgia
Germany
Ghana
Greece
Greenland
Grenada
Guatemala
Guinea

Guinea-Bissau
Guyana
Haiti
Honduras
Hungary
Iceland
India
Indonesia
Iran, Islamic Republic of
Iraq
Ireland
Israel
Italy
Jamaica
Japan
Jordan
Kazakhstan
Kenya
Korea, Democratic People's Rep. of
Korea, Republic of
Kuwait
Kyrgyz Republic
Lao People's Democratic Republic
Latvia
Lebanon
Liberia
Libya
Lithuania
Luxembourg
Macedonia, FYR
Madagascar
Malawi
Malaysia
Maldives
Mali
Malta
Mauritania
Mauritius
Mexico
Moldova
Mongolia
Morocco
Mozambique
Myanmar
Nepal
Netherlands
New Zealand
Nicaragua
Niger
Nigeria
Norway
Oman
Pakistan
Panama
Papua New Guinea
Paraguay
Peru
Philippines
Poland
Portugal
Qatar
Romania
Russian Federation
Rwanda
Samoa
Sao Tome and Principe
Saudi Arabia
Senegal
Seychelles
Sierra Leone
Singapore
Slovak Republic

Slovenia

Solomon Islands

Somalia

South Africa

Spain

Sri Lanka

St. Kitts and Nevis

St. Lucia

St. Vincent and the Grenadines

Sudan

Suriname

Sweden

Switzerland

Syrian Arab Republic

Tajikistan

Tanzania

Thailand

Togo

Tonga

Trinidad and Tobago

Tunisia

Turkey

Turkmenistan

Uganda

Ukraine

United Arab Emirates

United Kingdom

United States

Uruguay

Uzbekistan

Vanuatu

Venezuela, Republica Bolivariana de

Vietnam

Yemen, Republic of

Zambia

Zimbabwe

**TABLE A-2**: DESCRIPTION OF PROVISIONS BY TYPE

| Type | Provisions | Description |
|---|---|---|
| $WTO^+$ | Agriculture | Agreement to liberalize trade in agricultural commodities by reducing/abolishing barriers to trade such as tariffs, quotas and subsidies. Agreement to harmonize agricultural policies may also be included. Undertakings may be in line with, deepen and/or broaden the scope of provisions specified in the GATT 1994/WTO Agriculture Agreement. |
| $WTO^+$ | Anti-Dumping & Countervailing Measures (AD & CVM) | Agreement with rules on anti-dumping and countervailing measures that specify the conditions under which parties may deviate from their liberalization commitments to offset injury caused by dumping. Undertakings may be in line with, deepen and/or broaden the scope of provisions specified in the GATT 1994/WTO Agreement on Subsidies and Countervailing Measures (SCM Agreement). |
| $WTO^+$ | Customs Administration | Agreement to reduce administrative barriers to trade by simplifying customs administration with respect to issues such as import licensing requirements, valuation and nomenclature. Undertakings may be in line with, deepen and/or broaden the scope of provisions specified in the GATT 1994/WTO Agreement on Import Licensing Procedures. |
| $WTO^+$ | Export Restrictions | Agreement to liberalize duties, charges and/or quantitative restrictions on exported goods. Undertakings may be in line with, deepen and/or broaden the scope of provisions specified in the GATT 1994. |
| $WTO^+$ | Import Restrictions | Agreement to liberalize duties, charges and/or quantitative restrictions on imported goods. Undertakings may be in line with, deepen and/or broaden the scope of provisions specified in the GATT 1994. |
| $WTO^+$ | Intellectual Property Rights (IPR) | Agreement on the protection of intellectual property rights (copyrights, patents, trademarks, etc.) in foreign markets. Undertakings may be in line with, deepen and/or broaden the scope of provisions specified in the WTO Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS Agreement). |
| $WTO^+$ | Investment | Agreement to prohibit discriminatory trade-related investment practices such as local content requirements, trade balancing requirements and foreign exchange restrictions. Undertakings may be in line with, deepen and/or broaden the scope of provisions specified in the WTO Agreement on Trade-Related Investment Measures (TRIMS). |
| $WTO^+$ | Public Procurement | Agreement to grant access to foreign parties and further liberalize the market for public procurement. Undertakings may be in line with, deepen and/or broaden the scope of provisions specified in the WTO Agreement on Government Procurement (GPA). |

| Type | Provisions | Description |
|---|---|---|
| $WTO^{+}$ | Sanitary & Phytosanitary Measures (SPS) | Agreement to simplify and/or harmonize import requirements with respect to food safety and animal and plant health. Undertakings may be in line with, deepen and/or broaden the scope of provisions specified in the WTO Sanitary and Phytosanitary (SPS) Agreement. |
| $WTO^{+}$ | Services | Agreement to liberalize trade in services. Undertakings may be in line with, deepen and/or broaden the scope of provisions specified in the General Agreement on Trade in Services (GATS). |
| $WTO^{+}$ | State Aid | Agreement to restrict any form of aid that could give rise to unfair competitive advantages. Undertakings may be in line with, deepen and/or broaden the scope of provisions specified in the GATT 1994/WTO Agreement on Subsidies and Countervailing Measures (SCM Agreement). |
| $WTO^{+}$ | State Trading Enterprises (STE) | Agreements to ensure market access and non-discriminatory behaviour by governmental enterprises. Undertakings may be in line with, deepen and/or broaden the scope of provisions specified in the GATT 1994. |
| $WTO^{+}$ | Technical Barriers to Trade (TBT) | Agreements to reduce barriers to trade by simplifying and harmonizing standards and technical barriers such as testing and certification procedures. Undertakings may be in line with, deepen and/or broaden the scope of provisions specified in the WTO Agreement on TBT. |
| $WTO^{X}$ | Capital Mobility | Agreement to improve capital mobility by relaxing restrictions on foreign capital and facilitating cross-border financial transfers. |
| $WTO^{X}$ | Competitiion | Agreements on competition policy to restrict or prohibit monopolies' activities to promote undistorted competition. |
| $WTO^{X}$ | Environment | Agreement to uphold environmental laws, provided that they are not used as disguised barriers to trade. Commitments to enforce environmental laws so as not to attract (foreign) business activity that would exploit environmental resources |
| $WTO^{X}$ | Labour | Agreement to uphold labour laws so as not to attract (foreign) business activity that would exploit employees and/or to facilitate labour mobility. |

| Type | Provisions | Description |
|---|---|---|
| IQ | Consultations | Signatories wishing to address issues arising from the implementation of the RTA, or their broader economic partnership in general, may engage in a diplomatic dialogue known as consultations "with a view to finding a mutually satisfactory solution". When specified, consultation procedures provide details on when and where consultations are to be held, which parties may attend, and the issues that may be addressed. In most cases, signatories must first attempt to solve disputes according to consultation procedures before having access to the RTA's dispute settlement mechanism. |
| IQ | Definition | By providing definitions of key concepts, signatories increase the clarity, scope and certainty of their commitments. |
| IQ | Dispute Settlement | By agreeing on dispute settlement procedures, signatories reduce ambiguity and create a judicially binding mechanism that ensures the implementation of the RTA. |
| IQ | Duration & Termination | Signatories reduce ambiguity about their commitments by specifying the duration of the RTA and the means by which it can be terminated. |
| IQ | Evolutionary Clause | Signatories commit themselves to a built-in periodic review mechanism that facilitates amendments and improvements to the original RTA. |
| IQ | Institutional Framework | The signatories provide details on the institutional framework that will be used to oversee implementation. |
| IQ | Objectives | The signatories enhance the clarity and context of their commitments by specifying the objectives they envision by signing the RTA. |
| IQ | Plan & Schedule | The signatories commit themselves to a specific timetable by detailing the schedule according to which the RTA is to be implemented. |
| IQ | Transparency | The signatories commit themselves to creating greater institutional transparency, e.g. by agreeing on how and when information on economic policy will be shared. |

Source: Kohl et al. (2013), Table A2.

## **TABLE A-3:** CODING EXAMPLES

| TYPE | PROVISION | COVERED AND… | EXAMPLE(S) |
|---|---|---|---|
| WTO+ | Anti-Dumping & Countervailing Measures (AD&CVM) | NOT ENFORCEABLE | (...) The provisions of this Article shall not be subject to the dispute settlement provisions of this Agreement. |
| | | ENFORCEABLE | EACH PARTY RETAINS ITS RIGHTS AND OBLIGATIONS UNDER ARTICLE VI OF GATT 1994 AND THE WTO AGREEMENT, AND THEIR SUCCESSORS, WITH REGARD TO THE APPLICATION OF ANTIDUMPING AND COUNTERVAILING DUTIES. |
| WTO+ | Customs Administration | NOT ENFORCEABLE | The Member States recognise that the objectives of this Agreement may be promoted by harmonisation of customs policies and procedures in particular cases. Accordingly the Member States shall consult at the written request of either to determine any harmonisation which may be appropriate. |
| | | ENFORCEABLE | The Parties shall apply the provisions of Article VII of GATT 1994 and the WTO Agreement on the Implementation of Article VII of GATT 1994 for the purposes of determining the customs value of goods traded between the Parties. |
| WTO+ | Intellectual Property Rights (IPR) | NOT ENFORCEABLE | Each Party, recognizing the importance of protecting intellectual property in further improving the business environment in the Party, shall: (a) endeavor to improve its intellectual property protection system; (b) comply with the obligations set out in the international agreements relating to intellectual property to which it is a party; (c) endeavour to become a party to international agreements relating to intellectual property to which it is not a party; (d) endeavour to ensure transparent and streamlined administrative procedures concerning intellectual property; (e) endeavor to ensure adequate and effective enforcement of intellectual property rights; and (f) endeavor to further promote public awareness of protection of intellectual property. |
| | | ENFORCEABLE | The Parties agree that the WTO Agreement on Trade-Related Aspects of Intellectual Property Rights shall govern and apply to all intellectual property issues arising from this Agreement. // Each Party affirms its rights and obligations with respect to each other Party under the TRIPS Agreement. Each Party shall accord to the nationals of each other Party treatment no less favourable than it accords to its own nationals with regard to the protection1 of intellectual property, subject to the exceptions provided in the TRIPS Agreement and in those multilateral agreements concluded under the auspices of WIPO. // The Parties shall grant and ensure adequate and effective protection of intellectual property rights on a non-discriminatory basis, including effective measures for enforcing such rights against infringement, and particularly against counterfeiting and piracy. |
| WTO+ | Investment | NOT ENFORCEABLE | To promote investments, the Parties agree to enter into negotiations in order to progressively liberalise the investment regime. // To promote investments and to create a liberal, facilitative, transparent and competitive investment regime, the Parties agree to enter into negotiations in order to progressively liberalise their investment regimes, strengthen cooperation in investment, facilitate investment and improve transparency of investment rules and regulations, and provide for the protection of investments. // If a Party grants to a non-Party, after the entry into force of this Agreement, a more favourable investment framework than under this Agreement, it shall afford adequate opportunity to the other Parties to seek to obtain, including through possible negotiations, comparable conditions, on a mutually beneficial basis. |

| | | | |
|---|---|---|---|
| | | ENFORCEABLE | The Sides will not: - impose local taxes or charges, directly or indirectly on goods, covered by the present agreement, of another Side, at the rate that exceeds the level of relevant taxes or charges imposed on analogous goods of the local production or those produced in third countries; - introduce special restrictions or demands towards export and import of goods, covered by the present agreement, that in similar cases are not used towards analogous goods of the local production or those produced in third countries;- use different rules towards warehousing, unloading, storage, shipment of goods, originated from another country to the agreement, as well as towards repayments and remittances, with the exception of rules that in similar cases are used towards domestic goods or those originated from third countries. |
| WTO+ | Public Procurement | NOT ENFORCEABLE | The Parties will progressively develop their respective rules, conditions and practices on public procurement and shall grant suppliers of the other Party access to contract award procedures on their respective public procurement markets not less favourable than that accorded to companies of any third country. // The Parties consider the liberalization of their respective public procurement markets as an objective of this Agreement. The Parties aim at opening up of the award of public contracts on the basis of non-discrimination and reciprocity. // The Parties shall, subject to their laws, regulations and policies, exchange information in respect of their government procurement policies and practices. |
| | | ENFORCEABLE | The Parties consider the opening up of the award of public contracts on the basis of non-discrimination and reciprocity, to be a desirable objective. 2. As of the entry into force of this Agreement, both Parties shall grant each other's companies access to contract award procedures a treatment no less favourable than that accorded to companies of any other country. |
| WTO+ | Sanitary and Phytosanitary measures (SPS) | NOT ENFORCEABLE | The Parties shall aim to reduce differences in standardisation and conformity assessment. To this end the Parties shall conclude where appropriate agreements on mutual recognition in the field of conformity assessment. |
| | | ENFORCEABLE | Each party affirms its rights and obligations with respect to each other Party under the SPS Agreement. // Each Party undertakes not to adopt or maintain any prohibition or quantitative restriction on the importation of any goods of the other Parties or on the exportation of any goods destined for the territory of the other Parties, except in accordance with its WTO rights and obligations or other provisions in this Agreement. // The Parties reaffirm the rights and obligations relating to SPS measures under the SPS Agreement among those Parties that are parties to the said Agreement. // The Parties shall apply their regulations in sanitary and phytosanitary matters in a non-discriminatory fashion and shall not introduce any measures that have the effect of unduly obstructing trade. |
| WTO+ | Services | NOT ENFORCEABLE | The Parties agree to enter into negotiations to progressively liberalise trade in services with substantial sectorial coverage. // Each Party shall provide free transit over the territory of its country for goods originated within the customs territory of the other Party or having originated in third countries and destined for the customs territory of the other Party or any third country, and shall supply the exporters, importers, and shipping companies involved in such transit operations with all the available resources and services required for the execution of these transit operations on terms (including financial) that are not worse than the terms for providing the same resources and services to exporters, importers, and national shipping companies of any other third country. Contracting Parties shall conclude a special agreement on transit. |
| | | ENFORCEABLE | Each Party shall accord services and service suppliers of any other Party treatment no less favourable than that provided by those of the Party. // There shall be free movement of services. |
| WTO+ | State Aid | NOT ENFORCEABLE | The Parties shall review the issue of disciplines on subsidies related to trade in services in the light of any disciplines agreed under Article XV of GATS with a view to their incorporation into this Agreement. |

| | | | |
|---|---|---|---|
| | | ENFORCEABLE | Each Party agrees to eliminate and not reintroduce all forms of export subsidies for agricultural goods destined for the other Parties. // The following are incompatible with the proper functioning of this Agreement in so far as it affects trade between the Contracting Parties: any state aid which distorts or threatens to distort competition by favouring certain undertakings or the production of certain goods. // Contracting Parties shall not use state aid in the form of subsidies to enterprises or in any other form if the result of such state aid would be the distortion of normal economic conditions in the territory of the other Contracting Party. // The Parties confirm their rights and obligations arising from the WTO Agreement on Subsidies and Countervailing Measures. |
| $WTO^{+}$ | State Trading Enterprises (STE) | NOT ENFORCEABLE | The Contracting Parties shall adjust progressively any state monopoly of a commercial character so as to ensure that no discrimination regarding the conditions under which goods are procured and marketed exists between nationals of the Contracting Parties. |
| | | ENFORCEABLE | The Parties shall adjust progressively any state monopoly of a commercial character so as to ensure that by the date of entry into force of this Agreement, no discrimination regarding the conditions under which goods are procured and marketed exists between nationals of the Parties. // Each Party shall ensure that any state monopoly supplier of a service in its Area does not, in the supply of the monopoly service in the relevant market, act in a manner inconsistent with the Party's commitments under this Chapter. // The States Parties to this Agreement shall ensure that any state monopoly of a commercial character be adjusted, subject to the provisions laid down in Protocol D, so that no discrimination regarding the conditions under which goods are procured and marketed will exist between nationals of Party 1 and of Party 2. |
| $WTO^{+}$ | Technical Barriers to Trade (TBT) | NOT ENFORCEABLE | The parties agree to strengthen their co-operation in measures including technical barriers to trade/non-tariff measures. // The Member States shall:(a) examine the scope for taking action to harmonise requirements relating to such matters as standards, technical specifications and testing procedures, domestic labelling and restrictive trade practices; and (b) where appropriate, encourage government bodies and other organisations and institutions to work towards the harmonisation of such requirements. |
| | | ENFORCEABLE | Member States shall eliminate other non-tariff barriers on a gradual basis within a period of five years after the enjoyment of concessions applicable to those products. // Each Party undertakes not to adopt or maintain any prohibition or quantitative restriction on the importation of any goods of the other Parties or on the exportation of any goods destined for the territory of the other Parties, except in accordance with its WTO rights and obligations or other provisions in this Agreement. // The Parties reaffirm the rights and obligations relating to standards, technical regulations and conformity assessment procedures under the TBT Agreement among those Parties that are parties to the said Agreement. // The rights and obligations of the Parties, relating to technical barriers to trade (technical regulations, standards and conformity assessment procedures) and the respective measures, shall be governed by the WTO Agreement on Technical Barriers to Trade. |
| $WTO^{X}$ | Capital Mobility | NOT ENFORCEABLE | Not available. |
| | | ENFORCEABLE | Each Party shall permit all transfers relating to a covered investment to be made freely and without delay into and out of its territory. Such transfers include: (a) contributions to capital; (b) profits, dividends, interest, capital gains, royalty payments,management fees, and technical assistance and other fees; (c) proceeds from the sale of all or any part of the covered investment or from the partial or complete liquidation of the covered investment; (d) payments made under a contract entered into by the investor, or the covered investment, including payments made pursuant to a loan agreement; (e) payments made pursuant to paragraphs 1 and 2 of Article 10.6 and Article 10.11; and (f) payments arising under Section B. 2. Each Party shall permit returns in kind relating to a covered investment to be made as authorised or specified in a written agreement between the Party and a covered investment or an investor of the other Party. 3. Each Party shall permit transfers relating to a covered investment to be made in a freely usable currency at the market rate of exchange prevailing on the date of transfer. |

(continued on next page)

(continued from previous page)

| | | | |
|---|---|---|---|
| WTO[X] | COMPETITION | NOT ENFORCEABLE | The Commission shall adopt, at the General Secretariat's proposal, the rules which are needed to guard against or correct practices which may distort competition within the Subregion, such as dumping, improper price manipulations, manoeuvres made to upset the normal supply of raw materials and others with a like effect. In this respect, the Commission shall consider the problems that could derive from the imposition of levies and other restrictions on exports. |
| | | ENFORCEABLE | Where a Party’s monopoly supplier competes, either directly or through an affiliated company, in the supply of a service outside the scope of its monopoly rights and which is subject to that Party’s specific commitments, the Party shall ensure that such a supplier does not abuse its monopoly position to act in its territory in a manner inconsistent with such commitments. |
| WTO[X] | ENVIRONMENT | NOT ENFORCEABLE | Member Countries shall undertake joint policies that enable a better use of their renewable and non-renewable natural resources and the preservation and improvement of the environment. |
| | | ENFORCEABLE | A Party shall not fail to effectively enforce its environmental laws, through a sustained or recurring course of action or inaction, in a manner affecting trade between the Parties, after the date of entry into force of this Agreement. // Subject to the requirement that such measures are not applied in a manner which would constitute a means of arbitrary or unjustifiable discrimination between the Parties where the same conditions prevail, or a disguised restriction on international trade, nothing in this Chapter shall be construed to prevent the adoption or enforcement by a Party of measures: (a) necessary to protect public morals; (b) necessary to protect human, animal or plant life or health. // Each Party recognizes that it is inappropriate to encourage investments by investors of the other Party by relaxing its environmental measures. To this effect each Party should not waive or otherwise derogate from such environmental measures as an encouragement for establishment, acquisition or expansion of investments in its Area. |
| WTO[X] | Labour | NOT ENFORCEABLE | Cooperation between the Parties will complement the cooperation set out in other Chapters of this Agreement. Areas of cooperation may include but should not be limited to: science, agriculture including the wine industry, food production and processing, mining, energy, environment, small and medium enterprises, tourism, education, labour, human capital development and cultural collaboration. Cooperation on labour and employment matters of mutual interest and benefit will be based on the concept of decent work. |
| | | ENFORCEABLE | Neither Party shall require labour market testing, labour certification tests or other procedures of similar effect as a condition for temporary entry in respect of natural persons on whom the benefits of this Chapter are conferred. // Each Party shall grant entry and temporary stay to nationals of the other Party in accordance with this Chapter including the provisions of Annex 13. |

Source: Kohl et al. (2015), Table A3.

**TABLE A-4, PANEL A:** TRADE AGREEMENT HETEROGENEITY

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| RTA | 0.523*** | | | | | |
| | (0.00982) | | | | | |
| AD & CVM | | 0.155*** | | | 0.163*** | 0.241*** |
| | | (0.0279) | | | (0.0287) | (0.0329) |
| Agriculture | | -0.117*** | | | -0.179*** | -0.0317 |
| | | (0.0271) | | | (0.0279) | (0.0311) |
| Customs Administration | | 0.0694** | | | 0.00873 | 0.0776** |
| | | (0.0217) | | | (0.0225) | (0.0244) |
| Export Restrictions | | -0.0935*** | | | -0.0199 | -0.0721** |
| | | (0.0250) | | | (0.0269) | (0.0269) |
| IPR | | -0.244*** | | | -0.329*** | -0.224*** |
| | | (0.0211) | | | (0.0211) | (0.0293) |
| Import Restrictions | | 0.695*** | | | 0.717*** | 0.426*** |
| | | (0.0254) | | | (0.0258) | (0.0498) |
| Investment | | 0.0895*** | | | 0.107*** | 0.0418 |
| | | (0.0216) | | | (0.0229) | (0.0248) |
| Public Procurement | | -0.338*** | | | -0.278*** | -0.136*** |
| | | (0.0214) | | | (0.0218) | (0.0235) |
| SPS | | -0.182*** | | | -0.254*** | -0.292*** |
| | | (0.0181) | | | (0.0182) | (0.0187) |
| STE | | 0.0599** | | | -0.0371 | -0.248*** |
| | | (0.0199) | | | (0.0218) | (0.0239) |
| Services | | 0.433*** | | | 0.393*** | 0.282*** |
| | | (0.0238) | | | (0.0254) | (0.0282) |
| State Aid | | -0.0628* | | | -0.0910*** | -0.0142 |
| | | (0.0259) | | | (0.0271) | (0.0280) |
| TBT | | -0.258*** | | | -0.323*** | -0.200*** |
| | | (0.0198) | | | (0.0202) | (0.0218) |

(continued on next page)

(continued from previous page)

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Capital Mobility | | | 0.133*** | | -0.195*** | -0.0878*** |
| | | | (0.0204) | | (0.0250) | (0.0250) |
| Competition | | | 0.218*** | | 0.317*** | 0.260*** |
| | | | (0.0189) | | (0.0258) | (0.0276) |
| Environment | | | 0.148*** | | 0.114*** | 0.123*** |
| | | | (0.0233) | | (0.0249) | (0.0265) |
| Labour | | | 0.0627** | | 0.101*** | -0.145*** |
| | | | (0.0231) | | (0.0285) | (0.0336) |
| Consultations | | | | -0.560*** | | -0.540*** |
| | | | | (0.0190) | | (0.0239) |
| Definitions | | | | 0.170*** | | 0.159*** |
| | | | | (0.0162) | | (0.0233) |
| Dispute Settlement | | | | -0.0493* | | 0.00138 |
| | | | | (0.0193) | | (0.0247) |
| Duration & Termination | | | | 0.0376 | | -0.0883*** |
| | | | | (0.0197) | | (0.0242) |
| Evolutionary Clause | | | | -0.312*** | | -0.304*** |
| | | | | (0.0162) | | (0.0201) |
| Institutional Framework | | | | 0.387*** | | 0.184*** |
| | | | | (0.0307) | | (0.0378) |
| Objectives | | | | 0.661*** | | 0.482*** |
| | | | | (0.0246) | | (0.0379) |
| Plan & Schedule | | | | 0.189*** | | 0.241*** |
| | | | | (0.0176) | | (0.0208) |
| Transparency | | | | -0.131*** | | -0.0818*** |
| | | | | (0.0185) | | (0.0210) |
| $R^2$ | 0.861 | 0.862 | 0.861 | 0.862 | 0.862 | 0.862 |
| Observations | 657,703 | 657,703 | 657,703 | 657,703 | 657,703 | 657,703 |

Robust standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Results obtained with ordinary least squares (OLS), as described in Baier and Bergstrand (2007). Dependent variable is ln(nominal imports) in US$. Coefficients for GSP membership and importer-year, exporter-year, and importer-exporter fixed effects not shown for brevity.

**TABLE A-4, PANEL B:** TRADE AGREEMENT HETEROGENEITY: LEGAL ENFORCEABILITY

| | (2e) | (3e) | (5e) | (6e) |
|---|---|---|---|---|
| AD & CVM | 0.267*** | | 0.344*** | 0.311*** |
| | (0.0240) | | (0.0247) | (0.0282) |
| Agriculture | -0.102*** | | -0.0773** | 0.0418 |
| | (0.0247) | | (0.0253) | (0.0290) |
| Customs Administration | -0.0655** | | -0.123*** | -0.0365 |
| | (0.0215) | | (0.0215) | (0.0238) |
| Export Restrictions | -0.0977*** | | 0.0247 | -0.0221 |
| | (0.0244) | | (0.0268) | (0.0266) |
| Services | 0.0307 | | -0.0719* | -0.149*** |
| | (0.0242) | | (0.0292) | (0.0316) |
| Investment | 0.490*** | | 0.472*** | 0.317*** |
| | (0.0221) | | (0.0233) | (0.0250) |
| IPR | -0.378*** | | -0.370*** | -0.252*** |
| | (0.0189) | | (0.0187) | (0.0258) |
| Import Restrictions | 0.666*** | | 0.732*** | 0.375*** |
| | (0.0244) | | (0.0247) | (0.0491) |
| Public Procurement | -0.129*** | | -0.0733*** | -0.0535** |
| | (0.0188) | | (0.0192) | (0.0199) |
| SPS | 0.0492** | | 0.0610*** | -0.0738*** |
| | (0.0156) | | (0.0159) | (0.0174) |
| State Aid | -0.149*** | | -0.130*** | -0.00537 |
| | (0.0243) | | (0.0259) | (0.0272) |
| STE | 0.117*** | | 0.00808 | -0.180*** |
| | (0.0206) | | (0.0240) | (0.0253) |
| TBT | -0.279*** | | -0.351*** | -0.216*** |
| | (0.0180) | | (0.0188) | (0.0197) |
| (continued on next page) | | | | |
| | | | | |
| | | | | |

| (continued from previous page) | | | | |
|---|---|---|---|---|
| | (2e) | (3e) | (5e) | (6e) |
| Capital Mobility | | 0.227*** | -0.320*** | -0.198*** |
| | | (0.0178) | (0.0239) | (0.0239) |
| Competition | | 0.169*** | 0.0247 | 0.0715** |
| | | (0.0182) | (0.0236) | (0.0247) |
| Environment | | 0.0503** | 0.117*** | 0.0973*** |
| | | (0.0193) | (0.0226) | (0.0241) |
| Labour | | 0.132*** | 0.229*** | -0.0370 |
| | | (0.0194) | (0.0312) | (0.0333) |
| Consultations | | | | -0.570*** |
| | | | | (0.0244) |
| Definitions | | | | 0.240*** |
| | | | | (0.0242) |
| Dispute Settlement | | | | 0.0391 |
| | | | | (0.0233) |
| Duration & Termination | | | | 0.0107 |
| | | | | (0.0220) |
| Evolutionary Clause | | | | -0.327*** |
| | | | | (0.0179) |
| Institutional Framework | | | | 0.108** |
| | | | | (0.0366) |
| Objectives | | | | 0.518*** |
| | | | | (0.0366) |
| Plan & Schedule | | | | 0.243*** |
| | | | | (0.0208) |
| Transparency | | | | 0.00822 |
| | | | | (0.0219) |
| $R^2$ | 0.862 | 0.861 | 0.862 | 0.862 |
| Observations | 657,703 | 657,703 | 657,703 | 657,703 |
| | | | | |

Robust standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Results obtained with ordinary least squares (OLS), as described in Baier and Bergstrand (2007). Dependent variable is ln(nominal imports) in US$. Coefficients for GSP membership and importer-year, exporter-year, and importer-exporter fixed effects not shown for brevity

*Appendix Table A-5 Overview of countries and estimated trade effects*

| Country | class | GNI/cap (PPP) | Population (million) | Trade change (%) RTA approach | Trade change (%) Factor analysis | Trade with (%) EU | Trade with (%) USA |
|---|---|---|---|---|---|---|---|
| *a. TTIP countries* | | | | | | | |
| Luxembourg | ADV | 59,242 | 0.5 | 8.28 | 8.24 | 86 | 2 |
| Sweden | ADV | 45,127 | 9.6 | 4.20 | 4.13 | 59 | 6 |
| Netherlands | ADV | 45,040 | 16.8 | 4.21 | 4.12 | 79 | 4 |
| Austria | ADV | 44,339 | 8.5 | 4.62 | 4.58 | 71 | 6 |
| Germany | ADV | 44,322 | 80.7 | 4.83 | 4.74 | 60 | 7 |
| Denmark | ADV | 43,338 | 5.6 | 4.35 | 4.28 | 66 | 6 |
| Belgium | ADV | 40,215 | 11.2 | 5.37 | 5.28 | 76 | 4 |
| Finland | ADV | 38,964 | 5.4 | 3.97 | 3.91 | 55 | 6 |
| France | ADV | 37,802 | 65.9 | 4.55 | 4.46 | 60 | 7 |
| United Kingdom | ADV | 37,053 | 64.1 | 5.74 | 5.55 | 57 | 11 |
| Ireland | ADV | 36,737 | 4.6 | 13.09 | 12.67 | 54 | 25 |
| Italy | ADV | 34,108 | 60.2 | 3.37 | 3.29 | 54 | 7 |
| Spain | ADV | 31,376 | 46.6 | 3.13 | 3.09 | 67 | 4 |
| Cyprus | HiMID | 30,797 | 1.1 | 2.51 | 2.51 | 65 | 0 |
| Slovenia | HiMID | 27,373 | 2.1 | 2.56 | 2.56 | 73 | 2 |
| Malta | HiMID | 26,757 | 0.4 | 4.78 | 4.83 | 41 | 4 |
| Greece | HiMID | 26,215 | 11.0 | 3.24 | 3.22 | 57 | 3 |
| Czech Republic | HiMID | 25,978 | 10.5 | 3.22 | 3.21 | 84 | 2 |
| Slovak Republic | HiMID | 25,756 | 5.4 | 3.76 | 3.77 | 84 | 2 |
| Portugal | HiMID | 25,029 | 10.5 | 3.81 | 3.79 | 70 | 5 |
| Estonia | HiMID | 24,099 | 1.3 | 3.50 | 3.53 | 69 | 6 |
| Hungary | HiMID | 22,241 | 9.9 | 3.10 | 3.09 | 76 | 3 |
| Lithuania | HiMID | 21,490 | 3.0 | 7.35 | 7.38 | 71 | 5 |
| Poland | HiMID | 21,294 | 38.5 | 3.57 | 3.57 | 80 | 3 |
| Latvia | HiMID | 19,656 | 2.0 | 5.13 | 5.16 | 72 | 3 |
| Croatia | HiMID | 19,559 | 4.3 | 1.02 | 1.06 | 60 | 4 |
| Romania | MID | 17,052 | 20.0 | 2.50 | 2.50 | 68 | 3 |
| Bulgaria | MID | 15,189 | 7.3 | 2.90 | 2.97 | 64 | 2 |
| United States | ADV | 52,287 | 316.1 | 1.35 | 1.61 | 17 | 0 |

*b. Other countries; Advanced*

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Qatar | ADV | 123,282 | 2.2 | 0.12 | 0.15 | 18 | 1 |
| Macao | ADV | 108,819 | 0.6 | 0.11 | 0.11 | 3 | 4 |
| Kuwait | ADV | 84,800 | 3.4 | -0.23 | -0.14 | 6 | 9 |
| Singapore | ADV | 74,444 | 5.4 | -0.20 | -0.13 | 10 | 8 |
| Bermuda | ADV | 66,644 | 0.1 | 0.31 | 0.34 | 39 | 25 |
| Norway | ADV | 63,481 | 5.1 | 1.44 | 1.51 | 79 | 5 |
| Un Arab Emirates | ADV | 57,095 | 9.3 | 0.03 | 0.05 | 5 | 1 |
| Switzerland | ADV | 54,762 | 8.1 | 1.18 | 1.25 | 43 | 8 |
| Oman | ADV | 54,307 | 3.6 | -0.04 | -0.03 | 2 | 5 |
| Hong Kong | ADV | 52,530 | 7.2 | 0.12 | 0.17 | 17 | 5 |
| Saudi Arabia | ADV | 49,942 | 28.8 | -0.28 | -0.16 | 11 | 14 |
| Australia | ADV | 41,787 | 23.1 | -0.03 | 0.02 | 8 | 4 |
| Canada | ADV | 41,282 | 35.2 | -1.94 | -1.37 | 9 | 71 |
| Japan | ADV | 36,905 | 127.3 | -0.46 | -0.33 | 11 | 16 |
| Bahrain | ADV | 35,762 | 1.3 | -0.12 | -0.06 | 11 | 5 |
| Iceland | ADV | 34,848 | 0.3 | 1.00 | 1.04 | 73 | 4 |
| South Korea | ADV | 33,000 | 50.2 | -0.46 | -0.37 | 9 | 11 |
| New Zealand | ADV | 30,886 | 4.4 | -0.03 | 0.05 | 11 | 9 |

*c. Other countries; High-Middle income*

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Israel | HiMID | 30,244 | 8.1 | 0.61 | 0.65 | 26 | 38 |
| Trinidad Tobago | HiMID | 24,990 | 1.3 | -1.25 | -0.89 | 13 | 41 |
| Seychelles | HiMID | 22,937 | 0.1 | 0.55 | 0.56 | 69 | 2 |
| Russia | HiMID | 22,615 | 143.5 | 0.99 | 1.05 | 51 | 7 |
| Bahamas | HiMID | 21,975 | 0.4 | -1.12 | -0.85 | 3 | 30 |
| Malaysia | HiMID | 21,812 | 29.7 | -0.72 | -0.64 | 10 | 9 |
| Equatorial Guinea | HiMID | 20,934 | 0.8 | 0.08 | 0.18 | 47 | 10 |
| Chile | HiMID | 20,901 | 17.6 | -0.64 | -0.52 | 18 | 11 |
| Kazakhstan | HiMID | 20,300 | 17.0 | 0.61 | 0.65 | 45 | 3 |
| St. Kitts & Nevis | HiMID | 19,744 | 0.1 | 0.05 | 0.05 | 8 | 63 |
| Cuba | HiMID | 18,523 | 11.3 | 0.26 | 0.26 | 21 | 0 |
| Turkey | HiMID | 18,448 | 74.9 | 0.77 | 0.82 | 48 | 4 |
| Uruguay | HiMID | 18,318 | 3.4 | 0.00 | 0.02 | 19 | 3 |

*d. Other countries; Middle income*

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Venezuela | MID | 17,166 | 30.4 | -1.24 | -0.81 | 7 | 51 |
| Lebanon | MID | 16,856 | 4.5 | 0.25 | 0.26 | 16 | 2 |
| Gabon | MID | 16,412 | 1.7 | -0.36 | -0.01 | 11 | 47 |
| Panama | MID | 16,330 | 3.9 | -0.26 | -0.21 | 5 | 5 |
| Belarus | MID | 16,234 | 9.5 | 0.78 | 0.79 | 25 | 2 |
| Mexico | MID | 15,945 | 122.3 | -2.22 | -1.64 | 6 | 71 |
| Azerbaijan | MID | 15,861 | 9.4 | 0.52 | 0.61 | 64 | 8 |
| Mauritius | MID | 15,797 | 1.3 | 0.97 | 0.99 | 58 | 12 |
| Barbados | MID | 14,927 | 0.3 | -0.28 | -0.25 | 17 | 10 |
| Suriname | MID | 14,671 | 0.5 | 0.25 | 0.25 | 25 | 24 |
| Brazil | MID | 14,282 | 200.4 | -0.21 | -0.09 | 19 | 12 |
| Iraq | MID | 13,233 | 33.4 | -0.36 | -0.18 | 16 | 22 |
| Costa Rica | MID | 13,138 | 4.9 | -1.37 | -1.08 | 25 | 31 |
| Thailand | MID | 13,050 | 67.0 | -0.53 | -0.44 | 10 | 11 |
| Algeria | MID | 12,486 | 39.2 | 0.32 | 0.50 | 46 | 23 |
| South Africa | MID | 11,856 | 53.2 | 0.42 | 0.49 | 24 | 8 |
| Colombia | MID | 11,585 | 48.3 | -0.94 | -0.60 | 17 | 42 |
| Macedonia | MID | 11,513 | 2.1 | 1.45 | 1.47 | 73 | 1 |
| China | MID | 11,467 | 1,357.4 | -0.54 | -0.38 | 19 | 20 |
| Jordan | MID | 11,292 | 6.5 | -0.25 | -0.12 | 5 | 14 |
| Dominican Rep | MID | 11,262 | 10.4 | -1.60 | -1.17 | 11 | 50 |
| Peru | MID | 10,821 | 30.4 | -0.64 | -0.49 | 21 | 15 |
| Grenada | MID | 10,763 | 0.1 | 0.02 | 0.02 | 7 | 7 |
| Albania | MID | 10,451 | 2.9 | 0.90 | 0.92 | 72 | 2 |
| Egypt | MID | 10,443 | 82.1 | 0.47 | 0.54 | 36 | 6 |
| Ecuador | MID | 10,380 | 15.7 | -1.14 | -0.78 | 14 | 43 |
| St. Lucia | MID | 10,372 | 0.2 | -0.01 | -0.01 | 8 | 19 |
| Dominica | MID | 10,122 | 0.1 | -0.06 | -0.06 | 7 | 1 |
| Turkmenistan | MID | 10,055 | 5.2 | 0.02 | 0.02 | 7 | 1 |

*e. Other countries; Lower-Middle income*

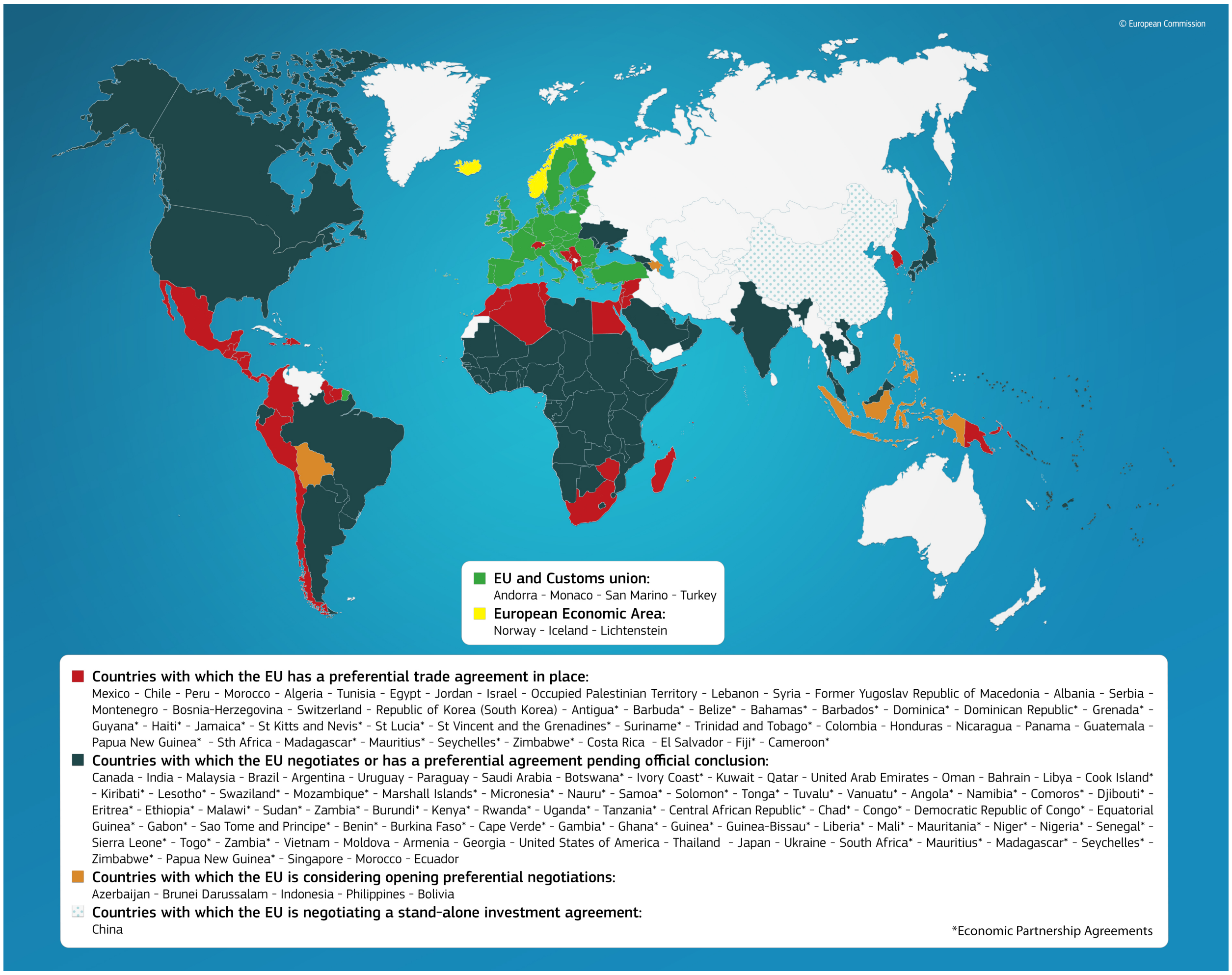
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Tunisia | LoMID | 9,719 | 10.9 | 1.46 | 1.48 | 74 | 2 |
| St Vinc & Grenad | LoMID | 9,685 | 0.1 | -0.02 | -0.02 | 32 | 2 |
| Bosnia & Herzeg | LoMID | 9,508 | 3.8 | 1.02 | 1.05 | 72 | 1 |
| Maldives | LoMID | 9,308 | 0.3 | -0.08 | -0.08 | 49 | 2 |
| Sri Lanka | LoMID | 9,167 | 20.5 | -0.23 | -0.03 | 32 | 21 |
| Indonesia | LoMID | 8,976 | 249.9 | -0.33 | -0.26 | 10 | 9 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ukraine | LoMID | 8,561 | 45.5 | 0.85 | 0.86 | 27 | 2 |
| Mongolia | LoMID | 8,486 | 2.8 | -0.43 | -0.43 | 2 | 0 |
| Armenia | LoMID | 7,891 | 3.0 | 0.89 | 0.90 | 41 | 9 |
| Jamaica | LoMID | 7,871 | 2.7 | -1.61 | -1.18 | 21 | 40 |
| Belize | LoMID | 7,618 | 0.3 | -0.37 | -0.30 | 23 | 40 |
| Philippines | LoMID | 7,598 | 98.4 | -0.60 | -0.49 | 12 | 13 |
| Paraguay | LoMID | 7,433 | 6.8 | 0.24 | 0.26 | 28 | 2 |
| El Salvador | LoMID | 7,255 | 6.3 | -1.37 | -0.99 | 8 | 45 |
| Fiji | LoMID | 7,002 | 0.9 | 0.20 | 0.20 | 10 | 17 |
| Guatemala | LoMID | 6,901 | 15.5 | -1.51 | -1.16 | 6 | 40 |
| Angola | LoMID | 6,869 | 21.5 | -0.20 | -0.02 | 15 | 23 |
| Morocco | LoMID | 6,776 | 33.0 | 0.96 | 0.99 | 56 | 5 |
| Georgia | LoMID | 6,137 | 4.5 | 0.82 | 0.83 | 31 | 7 |
| Cape Verde | LoMID | 5,962 | 0.5 | 0.71 | 0.70 | 86 | 2 |
| Guyana | LoMID | 5,787 | 0.8 | 0.09 | 0.09 | 16 | 29 |
| Bolivia | LoMID | 5,555 | 10.7 | -0.44 | -0.32 | 6 | 12 |
| Samoa | LoMID | 5,451 | 0.2 | 0.03 | 0.03 | 3 | 6 |
| Rep of Congo | LoMID | 5,309 | 4.4 | 0.07 | 0.23 | 24 | 21 |
| Tonga | LoMID | 5,211 | 0.1 | 0.02 | 0.02 | 0 | 11 |
| India | LoMID | 5,178 | 1,252.1 | 0.05 | 0.15 | 18 | 12 |
| Nigeria | LoMID | 5,166 | 173.6 | -0.11 | 0.12 | 30 | 30 |
| Uzbekistan | LoMID | 5,122 | 30.2 | 0.19 | 0.19 | 7 | 1 |
| Moldova | LoMID | 5,019 | 3.6 | 0.77 | 0.78 | 51 | 1 |
| Vietnam | LoMID | 4,901 | 89.7 | -0.50 | -0.35 | 18 | 19 |
| Pakistan | LoMID | 4,680 | 182.1 | -0.03 | 0.09 | 23 | 15 |
| Laos | LoMID | 4,402 | 6.8 | -0.06 | -0.06 | 10 | 2 |
| Nicaragua | LoMID | 4,367 | 6.1 | -1.58 | -1.10 | 8 | 57 |
| *f. Other countries; Low income* | | | | | | | |
| Honduras | LOW | 4,149 | 8.1 | -1.65 | -1.17 | 15 | 56 |
| Ghana | LOW | 3,785 | 25.9 | 0.56 | 0.65 | 55 | 9 |
| Zambia | LOW | 3,694 | 14.5 | 0.01 | 0.01 | 11 | 1 |
| Yemen | LOW | 3,491 | 24.4 | 0.00 | 0.00 | 6 | 6 |
| Sudan | LOW | 3,379 | 38.0 | 0.06 | 0.06 | 3 | 0 |
| Bangladesh | LOW | 3,082 | 156.6 | -0.04 | 0.13 | 51 | 21 |
| Ivory Coast | LOW | 2,990 | 20.3 | 0.66 | 0.67 | 39 | 11 |
| Kyrgyzstan | LOW | 2,964 | 5.7 | 0.18 | 0.18 | 3 | 0 |
| Cambodia | LOW | 2,814 | 15.1 | -1.58 | -1.26 | 26 | 39 |
| Sao T & Principe | LOW | 2,796 | 0.2 | 0.81 | 0.80 | 40 | 5 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Vanuatu | LOW | 2,723 | 0.3 | -0.15 | -0.15 | 2 | 1 |
| Mauritania | LOW | 2,719 | 3.9 | 0.49 | 0.50 | 33 | 0 |
| Kenya | LOW | 2,691 | 44.4 | 0.54 | 0.55 | 26 | 6 |
| Cameroon | LOW | 2,682 | 22.3 | 0.72 | 0.74 | 55 | 6 |
| Tajikistan | LOW | 2,417 | 8.2 | 0.00 | 0.00 | 9 | 1 |
| Nepal | LOW | 2,190 | 27.8 | 0.13 | 0.13 | 15 | 10 |
| Papua N Guinea | LOW | 2,183 | 7.3 | 0.19 | 0.19 | 14 | 2 |
| Senegal | LOW | 2,143 | 14.1 | 0.71 | 0.72 | 24 | 0 |
| Chad | LOW | 1,847 | 12.8 | -1.35 | -0.75 | 8 | 84 |
| Benin | LOW | 1,722 | 10.3 | 0.97 | 0.97 | 8 | 0 |
| Tanzania | LOW | 1,709 | 49.3 | 0.26 | 0.26 | 22 | 2 |
| Afghanistan | LOW | 1,703 | 30.6 | -0.36 | -0.32 | 8 | 4 |
| Haiti | LOW | 1,662 | 10.3 | -1.73 | -1.09 | 3 | 86 |
| Sierra Leone | LOW | 1,639 | 6.1 | 0.88 | 0.90 | 62 | 7 |
| Zimbabwe | LOW | 1,635 | 14.1 | 0.12 | 0.12 | 25 | 2 |
| Mali | LOW | 1,587 | 15.3 | 0.28 | 0.28 | 8 | 1 |
| Gambia | LOW | 1,559 | 1.8 | -0.01 | -0.01 | 20 | 0 |
| Solomon Islands | LOW | 1,538 | 0.6 | -0.12 | -0.12 | 11 | 0 |
| Burkina Faso | LOW | 1,527 | 16.9 | 0.44 | 0.44 | 11 | 0 |
| Guinea-Bissau | LOW | 1,456 | 1.7 | 0.47 | 0.46 | 2 | 0 |
| Comoros | LOW | 1,442 | 0.7 | 0.02 | 0.02 | 22 | 3 |
| Uganda | LOW | 1,420 | 37.6 | 0.38 | 0.39 | 36 | 3 |
| Rwanda | LOW | 1,405 | 11.8 | 0.16 | 0.16 | 16 | 8 |
| Madagascar | LOW | 1,326 | 22.9 | 0.47 | 0.48 | 45 | 5 |
| Ethiopia | LOW | 1,169 | 94.1 | 0.83 | 0.84 | 44 | 7 |
| Guinea | LOW | 1,131 | 11.7 | 0.83 | 0.85 | 32 | 6 |
| Togo | LOW | 1,084 | 6.8 | 1.26 | 1.27 | 29 | 2 |
| Mozambique | LOW | 1,065 | 25.8 | 0.30 | 0.31 | 47 | 1 |
| Cen Afr Republic | LOW | 911 | 4.6 | 0.09 | 0.08 | 46 | 4 |
| Niger | LOW | 865 | 17.8 | 0.45 | 0.45 | 1 | 49 |
| Burundi | LOW | 747 | 10.2 | 0.25 | 0.26 | 50 | 8 |
| Malawi | LOW | 730 | 16.4 | 0.33 | 0.34 | 26 | 6 |
| Liberia | LOW | 715 | 4.3 | 0.16 | 0.17 | 40 | 19 |
| D.R. Congo | LOW | 713 | 67.5 | -0.05 | 0.02 | 14 | 10 |

GNI per capita (PPP; 2013, in constant 2011 USD); total population in millions; trade change is average percent change for a country's total exports and total imports; shading indicates negative value

## **MAP A-1:** RTAS OF THE EU WITH THE WORLD




Source: http://trade.ec.europa.eu/doclib/html/149622.htm.

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